SCHOTT
glass made of ideas

# Optical Filter Glass

Data Sheets

# Introduction

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

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

## Resistance against humidity

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

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

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

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

## Refractive index

The refractive indices of the glass types are stated as reference values. Due to different annealing conditions, there are deviations from batch to batch. Any refractive indices within the defined wavelength range can be calculated from the Sellmeier dispersion formula.

Note that the wavelength must be entered into the Sellmeier dispersion formula in units of µm in order to calculate the correct refractive index from the given coefficients.

$$n^2-1=\frac{B_1\lambda^2}{\lambda^2-C_1}+\frac{B_2\lambda^2}{\lambda^2-C_2}+\frac{B_3\lambda^2}{\lambda^2-C_3}$$

## Transmission

The internal transmittance $\tau_i$ is given for the respective reference thickness $d$.

$$\tau_{i,d_1}=(\tau_{i,d})^{\left(\frac{d_1}{d}\right)}$$

The formula can be used to calculate the internal transmittance for any other thickness $d_1$.

# Nomenclature

| | |
|---|---|
| AR | Alkali resistance class in accordance with ISO 10629 |
| d | Reference thickness |
| $B_1$, $B_2$, $B_3$ | Coefficients of the Sellmeier dispersion formula |
| $C_1$, $C_2$, $C_3$ | Coefficients of the Sellmeier dispersion formula |
| FR | Stain resistance class in accordance with catalog “SCHOTT Optical Filter Glass” |
| HK[0,1/20] | Knoop hardness in accordance with ISO 9385 |
| $n_d$ | Refractive index at the d-line |
| $P_e$ | Excitation purity |
| SR | Acid resistance class in accordance with ISO 8424 |
| Tg | Transformation temperature in accordance with ISO 7884-8 |
| Tk | Temperature coefficient longpass filter |
| x, y | Chromaticity coordinates |
| Y | Tristimulus value of brightness |
| $\alpha_{-30\,°C/+70\,°C}$ | Linear coefficient of thermal expansion in $10^{-6}$/K in the temperature range [– 30 °C to + 70 °C] |
| $\alpha_{20\,°C/200\,°C}$ | Linear coefficient of thermal expansion in $10^{-6}$/K in the temperature range [+ 20 °C to + 200 °C] |
| $\alpha_{20\,°C/300\,°C}$ | Linear coefficient of thermal expansion in $10^{-6}$/K in the temperature range [+ 20 °C to + 300 °C]. Some glasses have such a low Tg, that the measurement for those glass types is not feasible. |
| $\lambda$ | Wavelength |
| $\lambda_d$ | Dominant wavelength |
| $\tau_i$ | Internal transmittance |
| $\rho$ | Density |
| $P_d$ | Reflection Factor at the d-line |

For further explanations, see the catalog “SCHOTT Optical Filter Glass”.

# Table of contents

# Data Sheet

## BG3

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,921 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | | ≥ | 0,94 |
| $\tau_i$ (633 nm) | | ≤ | 0,00005 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,51 |
| $n_d$ (587,6 nm) | | = | 1,51 |
| **Sellmeier coefficients** | | | |
| valid from 300 nm to 1600 nm | | | |
| $B_1$ | 0,8735 | | |
| $B_2$ | 0,3716 | | |
| $B_3$ | 1,1076 | | |
| $C_1$ | 9,390E-03 | µm² | |
| $C_2$ | 1,0998E-02 | µm² | |
| $C_3$ | 145,898 | µm² | |
| **Internal quality** | | | |
| Bubble class | 1 | | |

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

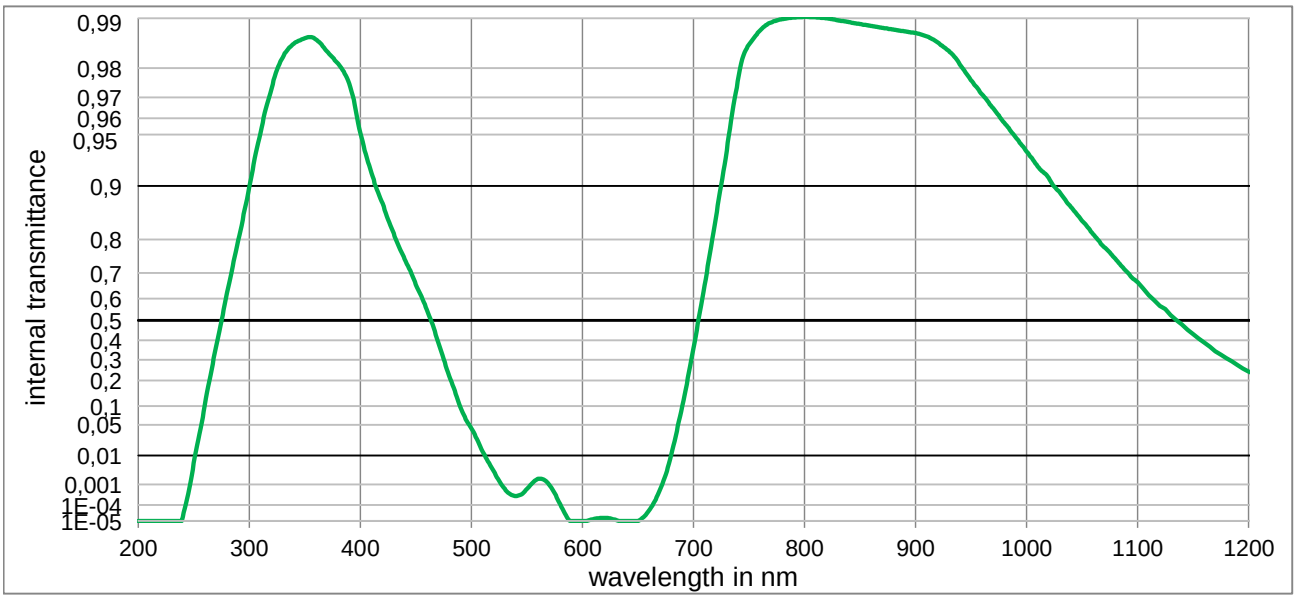
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 478 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 8,8 |
| $\alpha_{(20°C/300°C)}$ | | = | 10,1 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

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

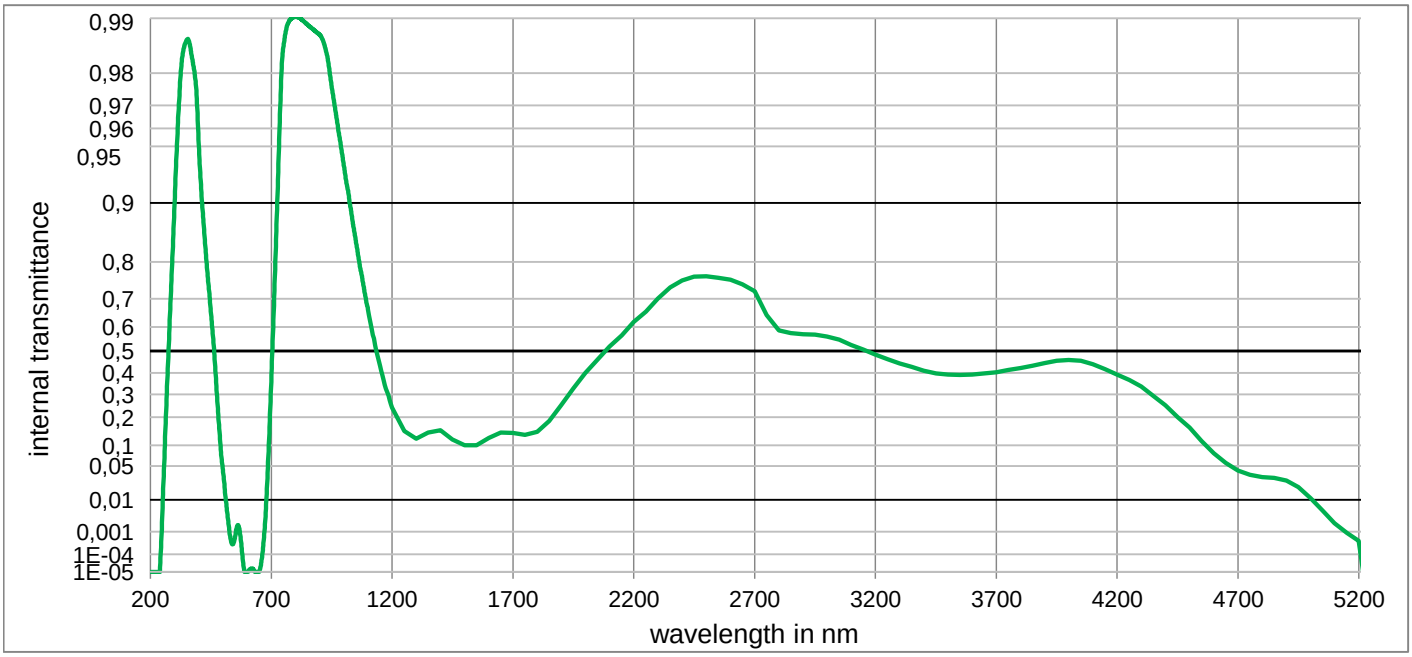
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG3




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,000E-05 | 500 | 4,300E-02 | 800 | 9,902E-01 | 1100 | 6,665E-01 | 2200 | 6,200E-01 | 3700 | 4,038E-01 |
| 210 | < 1,000E-05 | 510 | 1,276E-02 | 810 | 9,901E-01 | 1110 | 6,152E-01 | 2250 | 6,566E-01 | 3750 | 4,132E-01 |
| 220 | < 1,000E-05 | 520 | 3,214E-03 | 820 | 9,900E-01 | 1120 | 5,680E-01 | 2300 | 7,009E-01 | 3800 | 4,226E-01 |
| 230 | < 1,000E-05 | 530 | 6,442E-04 | 830 | 9,897E-01 | 1130 | 5,247E-01 | 2350 | 7,349E-01 | 3850 | 4,330E-01 |
| 240 | 1,871E-05 | 540 | 2,973E-04 | 840 | 9,895E-01 | 1140 | 4,800E-01 | 2400 | 7,538E-01 | 3900 | 4,462E-01 |
| 250 | 6,053E-03 | 550 | 6,182E-04 | 850 | 9,892E-01 | 1150 | 4,319E-01 | 2450 | 7,642E-01 | 3950 | 4,557E-01 |
| 260 | 1,030E-01 | 560 | 1,673E-03 | 860 | 9,889E-01 | 1160 | 3,884E-01 | 2500 | 7,651E-01 | 4000 | 4,600E-01 |
| 270 | 3,640E-01 | 570 | 1,000E-03 | 870 | 9,886E-01 | 1170 | 3,432E-01 | 2550 | 7,613E-01 | 4050 | 4,557E-01 |
| 280 | 6,260E-01 | 580 | 1,108E-04 | 880 | 9,883E-01 | 1180 | 3,081E-01 | 2600 | 7,557E-01 | 4100 | 4,400E-01 |
| 290 | 7,980E-01 | 590 | < 1,000E-05 | 890 | 9,880E-01 | 1190 | 2,727E-01 | 2650 | 7,434E-01 | 4150 | 4,170E-01 |
| 300 | 8,990E-01 | 600 | < 1,000E-05 | 900 | 9,877E-01 | 1200 | 2,412E-01 | 2700 | 7,236E-01 | 4200 | 3,915E-01 |
| 310 | 9,510E-01 | 610 | 1,340E-05 | 910 | 9,872E-01 | 1250 | 1,462E-01 | 2750 | 6,443E-01 | 4250 | 3,670E-01 |
| 320 | 9,734E-01 | 620 | 1,611E-05 | 920 | 9,860E-01 | 1300 | 1,200E-01 | 2800 | 5,868E-01 | 4300 | 3,368E-01 |
| 330 | 9,828E-01 | 630 | 1,167E-05 | 930 | 9,842E-01 | 1350 | 1,406E-01 | 2850 | 5,764E-01 | 4350 | 2,925E-01 |
| 340 | 9,858E-01 | 640 | < 1,000E-05 | 940 | 9,810E-01 | 1400 | 1,500E-01 | 2900 | 5,717E-01 | 4400 | 2,500E-01 |
| 350 | 9,868E-01 | 650 | < 1,000E-05 | 950 | 9,764E-01 | 1450 | 1,179E-01 | 2950 | 5,698E-01 | 4450 | 2,000E-01 |
| 360 | 9,866E-01 | 660 | 4,721E-05 | 960 | 9,712E-01 | 1500 | 1,000E-01 | 3000 | 5,623E-01 | 4500 | 1,600E-01 |
| 370 | 9,842E-01 | 670 | 5,929E-04 | 970 | 9,651E-01 | 1550 | 1,000E-01 | 3050 | 5,481E-01 | 4550 | 1,132E-01 |
| 380 | 9,812E-01 | 680 | 1,040E-02 | 980 | 9,574E-01 | 1600 | 1,236E-01 | 3100 | 5,264E-01 | 4600 | 7,780E-02 |
| 390 | 9,752E-01 | 690 | 1,004E-01 | 990 | 9,484E-01 | 1650 | 1,406E-01 | 3150 | 5,066E-01 | 4650 | 5,610E-02 |
| 400 | 9,510E-01 | 700 | 3,590E-01 | 1000 | 9,369E-01 | 1700 | 1,400E-01 | 3200 | 4,840E-01 | 4700 | 4,159E-02 |
| 410 | 9,160E-01 | 710 | 6,550E-01 | 1010 | 9,230E-01 | 1750 | 1,330E-01 | 3250 | 4,632E-01 | 4750 | 3,483E-02 |
| 420 | 8,740E-01 | 720 | 8,460E-01 | 1020 | 9,099E-01 | 1800 | 1,443E-01 | 3300 | 4,443E-01 | 4800 | 3,170E-02 |
| 430 | 8,150E-01 | 730 | 9,380E-01 | 1030 | 8,909E-01 | 1850 | 1,849E-01 | 3350 | 4,274E-01 | 4850 | 3,076E-02 |
| 440 | 7,450E-01 | 740 | 9,760E-01 | 1040 | 8,680E-01 | 1900 | 2,500E-01 | 3400 | 4,100E-01 | 4900 | 2,729E-02 |
| 450 | 6,580E-01 | 750 | 9,856E-01 | 1050 | 8,428E-01 | 1950 | 3,283E-01 | 3450 | 3,981E-01 | 4950 | 2,004E-02 |
| 460 | 5,500E-01 | 760 | 9,881E-01 | 1060 | 8,133E-01 | 2000 | 4,000E-01 | 3500 | 3,915E-01 | 5000 | 1,099E-02 |
| 470 | 3,930E-01 | 770 | 9,894E-01 | 1070 | 7,800E-01 | 2050 | 4,623E-01 | 3550 | 3,896E-01 | 5050 | 5,082E-03 |
| 480 | 2,220E-01 | 780 | 9,899E-01 | 1080 | 7,463E-01 | 2100 | 5,200E-01 | 3600 | 3,915E-01 | 5100 | 2,032E-03 |
| 490 | 9,700E-02 | 790 | 9,901E-01 | 1090 | 7,060E-01 | 2150 | 5,670E-01 | 3650 | 3,981E-01 | 5150 | 9,099E-04 |

# Data Sheet

## BG7

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,919 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | | ≥ | 0,25 |
| $\tau_i$ (488 nm) | | ≥ | 0,78 |
| $\tau_i$ (633 nm) | | ≤ | 0,08 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,53 |
| $n_e$ (546 nm) | | = | 1,52 |
| $n_d$ (587,6 nm) | | = | 1,52 |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | 0,5574 | | |
| $B_2$ | 0,7122 | | |
| $B_3$ | 37,3513 | | |
| $C_2$ | 1,8447E-02 | µm² | |
| $C_3$ | 5502,533 | µm² | |
| **Internal quality** | | | |
| Bubble class | 1 | | |

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

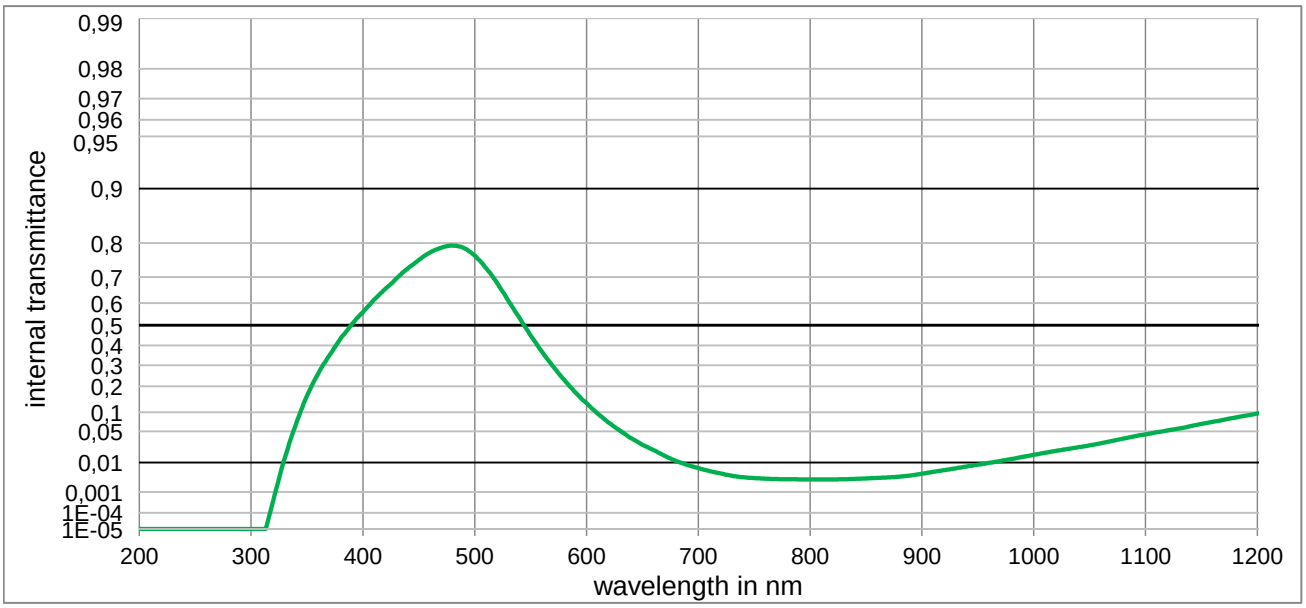
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 447 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 8,7 |
| $\alpha_{(20°C/300°C)}$ | | = | 10,0 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Robust glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,191 | 0,152 | 0,138 |
| | y | 0,272 | 0,229 | 0,200 |
| | Y | 37,9 | 20,6 | 12,7 |
| | $\lambda_d$ | 486 nm | 484 nm | 482 nm |
| | $P_e$ | 0,493 | 0,675 | 0,758 |
| Illuminant A | x | 0,262 | 0,179 | 0,145 |
| | y | 0,406 | 0,360 | 0,317 |
| | Y | 30,1 | 14,5 | 8,2 |
| | $\lambda_d$ | 495 nm | 492 nm | 490 nm |
| | $P_e$ | 0,438 | 0,654 | 0,755 |

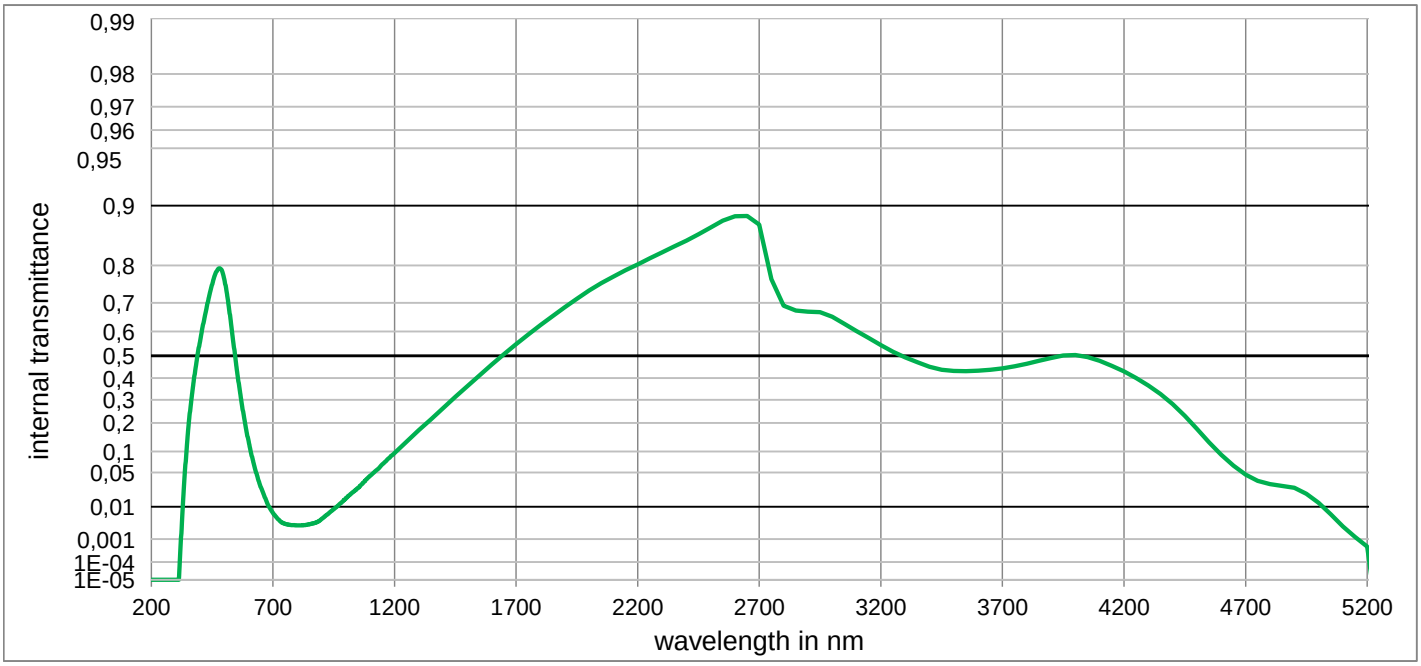
| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG7




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 7,670E-01 | 800 | 2,994E-03 | 1100 | 4,400E-02 | 2200 | 8,025E-01 | 3700 | 4,437E-01 |
| 210 | < | 1,0E-05 | 510 | 7,300E-01 | 810 | 2,991E-03 | 1110 | 4,807E-02 | 2250 | 8,157E-01 | 3750 | 4,531E-01 |
| 220 | < | 1,0E-05 | 520 | 6,790E-01 | 820 | 3,000E-03 | 1120 | 5,220E-02 | 2300 | 8,274E-01 | 3800 | 4,648E-01 |
| 230 | < | 1,0E-05 | 530 | 6,110E-01 | 830 | 3,035E-03 | 1130 | 5,630E-02 | 2350 | 8,386E-01 | 3850 | 4,779E-01 |
| 240 | < | 1,0E-05 | 540 | 5,350E-01 | 840 | 3,117E-03 | 1140 | 6,164E-02 | 2400 | 8,493E-01 | 3900 | 4,903E-01 |
| 250 | < | 1,0E-05 | 550 | 4,500E-01 | 850 | 3,240E-03 | 1150 | 6,717E-02 | 2450 | 8,600E-01 | 3950 | 5,013E-01 |
| 260 | < | 1,0E-05 | 560 | 3,690E-01 | 860 | 3,370E-03 | 1160 | 7,262E-02 | 2500 | 8,704E-01 | 4000 | 5,034E-01 |
| 270 | < | 1,0E-05 | 570 | 2,950E-01 | 870 | 3,515E-03 | 1170 | 7,810E-02 | 2550 | 8,805E-01 | 4050 | 4,947E-01 |
| 280 | < | 1,0E-05 | 580 | 2,290E-01 | 880 | 3,723E-03 | 1180 | 8,353E-02 | 2600 | 8,866E-01 | 4100 | 4,778E-01 |
| 290 | < | 1,0E-05 | 590 | 1,740E-01 | 890 | 4,074E-03 | 1190 | 8,971E-02 | 2650 | 8,869E-01 | 4150 | 4,560E-01 |
| 300 | < | 1,0E-05 | 600 | 1,310E-01 | 900 | 4,627E-03 | 1200 | 9,577E-02 | 2700 | 8,749E-01 | 4200 | 4,300E-01 |
| 310 | < | 1,0E-05 | 610 | 9,600E-02 | 910 | 5,299E-03 | 1250 | 1,317E-01 | 2750 | 7,671E-01 | 4250 | 3,997E-01 |
| 320 | | 4,675E-04 | 620 | 7,000E-02 | 920 | 5,997E-03 | 1300 | 1,713E-01 | 2800 | 6,908E-01 | 4300 | 3,656E-01 |
| 330 | | 1,289E-02 | 630 | 5,100E-02 | 930 | 6,812E-03 | 1350 | 2,151E-01 | 2850 | 6,751E-01 | 4350 | 3,263E-01 |
| 340 | | 6,592E-02 | 640 | 3,700E-02 | 940 | 7,737E-03 | 1400 | 2,635E-01 | 2900 | 6,716E-01 | 4400 | 2,809E-01 |
| 350 | | 1,600E-01 | 650 | 2,700E-02 | 950 | 8,668E-03 | 1450 | 3,140E-01 | 2950 | 6,698E-01 | 4450 | 2,297E-01 |
| 360 | | 2,600E-01 | 660 | 2,070E-02 | 960 | 9,771E-03 | 1500 | 3,629E-01 | 3000 | 6,536E-01 | 4500 | 1,774E-01 |
| 370 | | 3,490E-01 | 670 | 1,500E-02 | 970 | 1,100E-02 | 1550 | 4,125E-01 | 3050 | 6,281E-01 | 4550 | 1,280E-01 |
| 380 | | 4,350E-01 | 680 | 1,103E-02 | 980 | 1,244E-02 | 1600 | 4,621E-01 | 3100 | 6,016E-01 | 4600 | 9,050E-02 |
| 390 | | 5,040E-01 | 690 | 8,610E-03 | 990 | 1,407E-02 | 1650 | 5,077E-01 | 3150 | 5,741E-01 | 4650 | 6,410E-02 |
| 400 | | 5,610E-01 | 700 | 6,910E-03 | 1000 | 1,593E-02 | 1700 | 5,497E-01 | 3200 | 5,456E-01 | 4700 | 4,610E-02 |
| 410 | | 6,140E-01 | 710 | 5,620E-03 | 1010 | 1,784E-02 | 1750 | 5,885E-01 | 3250 | 5,170E-01 | 4750 | 3,580E-02 |
| 420 | | 6,570E-01 | 720 | 4,710E-03 | 1020 | 1,981E-02 | 1800 | 6,238E-01 | 3300 | 4,930E-01 | 4800 | 3,122E-02 |
| 430 | | 6,950E-01 | 730 | 3,974E-03 | 1030 | 2,181E-02 | 1850 | 6,562E-01 | 3350 | 4,715E-01 | 4850 | 2,870E-02 |
| 440 | | 7,280E-01 | 740 | 3,550E-03 | 1040 | 2,396E-02 | 1900 | 6,854E-01 | 3400 | 4,512E-01 | 4900 | 2,660E-02 |
| 450 | | 7,540E-01 | 750 | 3,317E-03 | 1050 | 2,634E-02 | 1950 | 7,124E-01 | 3450 | 4,376E-01 | 4950 | 2,000E-02 |
| 460 | | 7,755E-01 | 760 | 3,182E-03 | 1060 | 2,928E-02 | 2000 | 7,365E-01 | 3500 | 4,328E-01 | 5000 | 1,250E-02 |
| 470 | | 7,881E-01 | 770 | 3,080E-03 | 1070 | 3,273E-02 | 2050 | 7,569E-01 | 3550 | 4,316E-01 | 5050 | 6,300E-03 |
| 480 | | 7,936E-01 | 780 | 3,032E-03 | 1080 | 3,649E-02 | 2100 | 7,736E-01 | 3600 | 4,338E-01 | 5100 | 2,760E-03 |
| 490 | | 7,880E-01 | 790 | 3,009E-03 | 1090 | 4,051E-02 | 2150 | 7,893E-01 | 3650 | 4,378E-01 | 5150 | 1,210E-03 |

# Data Sheet

## BG18

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,915 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (350 nm) | ≥ | 0,3 | |
| $\tau_i$ (405 nm) | ≥ | 0,65 | |
| $\tau_i$ (514 nm) | ≥ | 0,88 | |
| $\tau_i$ (633 nm) | ≤ | 0,25 | |
| $\tau_i$ (694 nm) | ≤ | 0,03 | |
| $\tau_i$ (1060 nm) | ≤ | 0,0005 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,54 | |
| $n_e$ (546 nm) | = | 1,54 | |
| $n_d$ (587,6 nm) | = | 1,53 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | 1,2546 | | |
| $B_2$ | 0,0793 | | |
| $B_3$ | 90,1178 | | |
| $C_1$ | 1,531E-03 | µm² | |
| $C_2$ | 7,2019E-02 | µm² | |
| $C_3$ | 8112,428 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

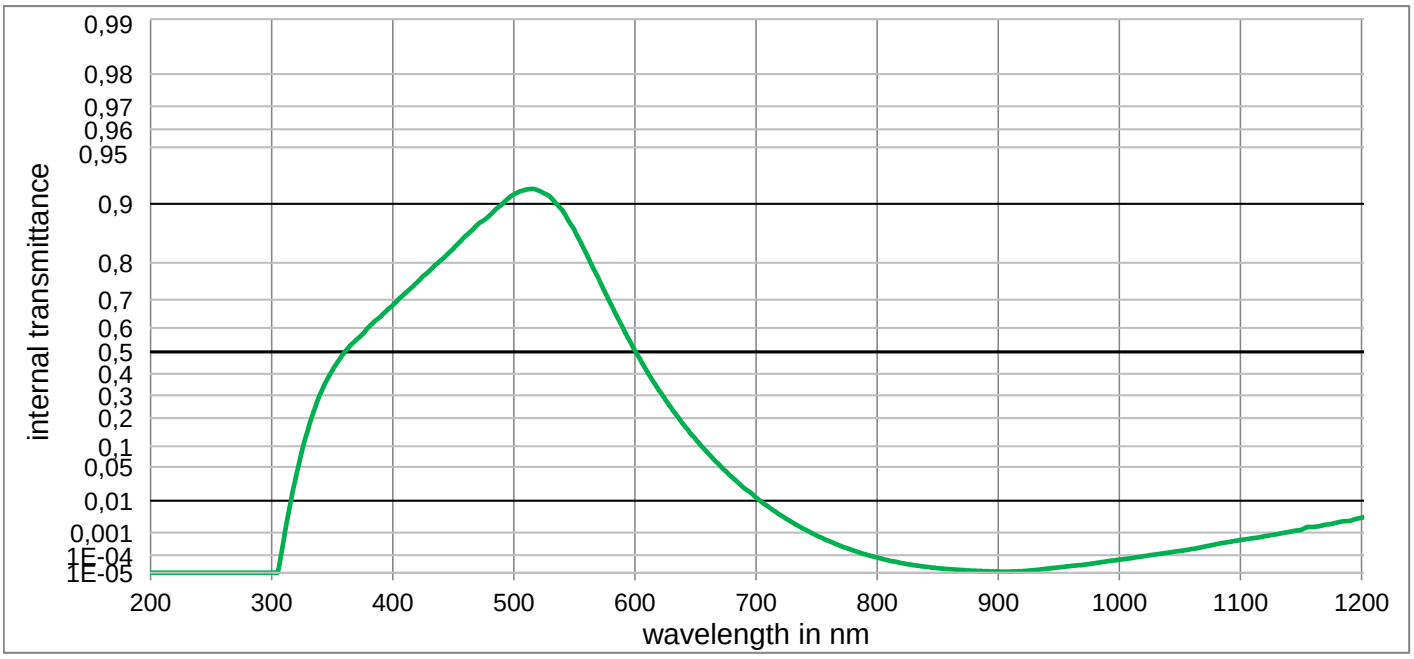
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 457 °C |
| **Thermal expansion in** | | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 7,4 | |
| $\alpha_{(20°C/300°C)}$ | = | 8,9 | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 2 |
| | AR class | = | 2 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

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

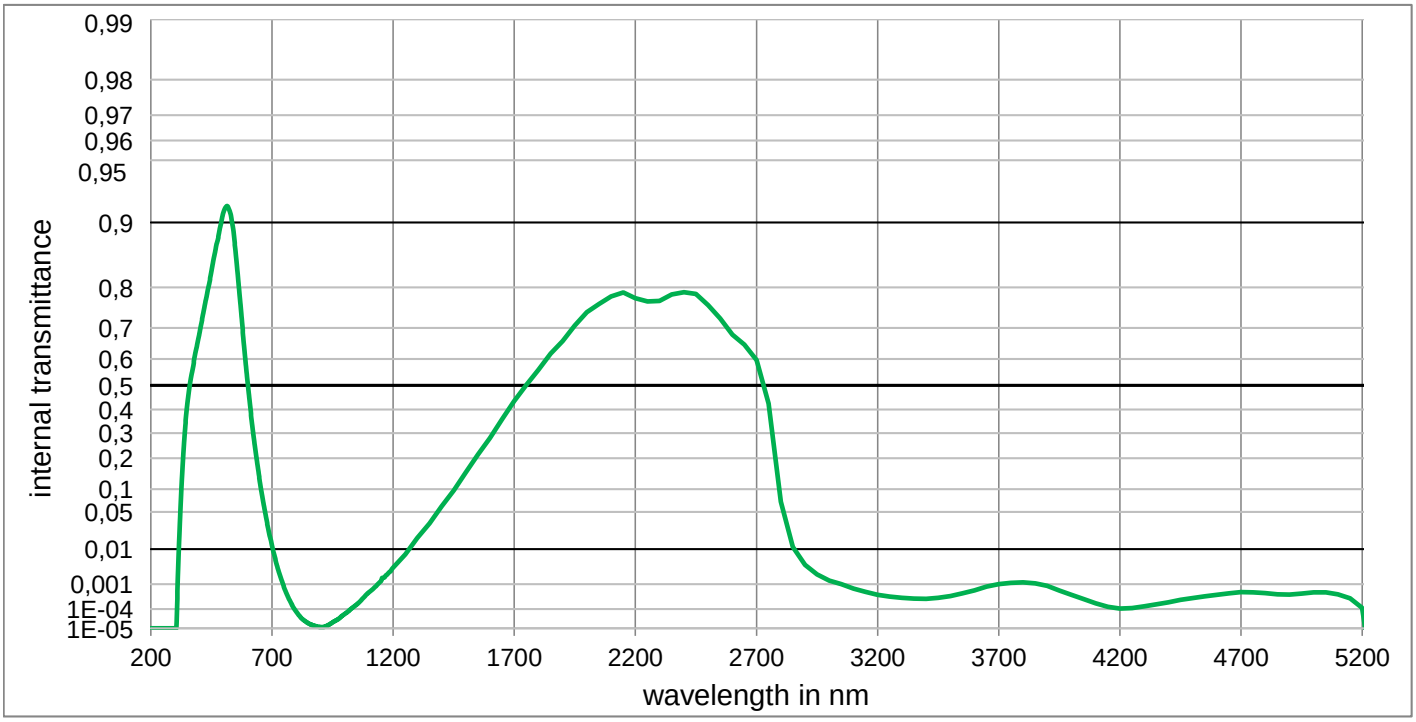
| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG18




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,109E-01 | 800 | 7,603E-05 | 1100 | 5,023E-04 | 2200 | 7,765E-01 | 3700 | 1,000E-03 |
| 210 | < 1,0E-05 | 510 | 9,159E-01 | 810 | 5,164E-05 | 1110 | 5,957E-04 | 2250 | 7,690E-01 | 3750 | 1,117E-03 |
| 220 | < 1,0E-05 | 520 | 9,150E-01 | 820 | 3,784E-05 | 1120 | 7,145E-04 | 2300 | 7,700E-01 | 3800 | 1,156E-03 |
| 230 | < 1,0E-05 | 530 | 9,081E-01 | 830 | 2,904E-05 | 1130 | 8,591E-04 | 2350 | 7,849E-01 | 3850 | 1,072E-03 |
| 240 | < 1,0E-05 | 540 | 8,920E-01 | 840 | 2,323E-05 | 1140 | 1,056E-03 | 2400 | 7,900E-01 | 3900 | 8,650E-04 |
| 250 | < 1,0E-05 | 550 | 8,630E-01 | 850 | 1,907E-05 | 1150 | 1,260E-03 | 2450 | 7,858E-01 | 3950 | 5,821E-04 |
| 260 | < 1,0E-05 | 560 | 8,190E-01 | 860 | 1,661E-05 | 1160 | 1,624E-03 | 2500 | 7,600E-01 | 4000 | 4,000E-04 |
| 270 | < 1,0E-05 | 570 | 7,610E-01 | 870 | 1,474E-05 | 1170 | 1,940E-03 | 2550 | 7,263E-01 | 4050 | 2,735E-04 |
| 280 | < 1,0E-05 | 580 | 6,860E-01 | 880 | 1,331E-05 | 1180 | 2,299E-03 | 2600 | 6,800E-01 | 4100 | 1,803E-04 |
| 290 | < 1,0E-05 | 590 | 6,000E-01 | 890 | 1,245E-05 | 1190 | 2,572E-03 | 2650 | 6,484E-01 | 4150 | 1,256E-04 |
| 300 | < 1,0E-05 | 600 | 5,060E-01 | 900 | 1,188E-05 | 1200 | 3,303E-03 | 2700 | 5,956E-01 | 4200 | 1,064E-04 |
| 310 | 5,6E-04 | 610 | 4,110E-01 | 910 | 1,184E-05 | 1250 | 7,500E-03 | 2750 | 4,255E-01 | 4250 | 1,102E-04 |
| 320 | 3,300E-02 | 620 | 3,220E-01 | 920 | 1,265E-05 | 1300 | 1,760E-02 | 2800 | 7,000E-02 | 4300 | 1,327E-04 |
| 330 | 1,560E-01 | 630 | 2,420E-01 | 930 | 1,465E-05 | 1350 | 3,270E-02 | 2850 | 1,117E-02 | 4350 | 1,614E-04 |
| 340 | 3,050E-01 | 640 | 1,750E-01 | 940 | 1,771E-05 | 1400 | 6,000E-02 | 2900 | 4,000E-03 | 4400 | 2,000E-04 |
| 350 | 4,160E-01 | 650 | 1,220E-01 | 950 | 2,149E-05 | 1450 | 9,630E-02 | 2950 | 2,113E-03 | 4450 | 2,553E-04 |
| 360 | 4,970E-01 | 660 | 8,200E-02 | 960 | 2,560E-05 | 1500 | 1,500E-01 | 3000 | 1,318E-03 | 4500 | 2,972E-04 |
| 370 | 5,520E-01 | 670 | 5,300E-02 | 970 | 3,000E-05 | 1550 | 2,136E-01 | 3050 | 1,000E-03 | 4550 | 3,508E-04 |
| 380 | 6,030E-01 | 680 | 3,300E-02 | 980 | 3,747E-05 | 1600 | 2,800E-01 | 3100 | 7,000E-04 | 4600 | 4,000E-04 |
| 390 | 6,430E-01 | 690 | 1,992E-02 | 990 | 4,756E-05 | 1650 | 3,594E-01 | 3150 | 5,248E-04 | 4650 | 4,667E-04 |
| 400 | 6,820E-01 | 700 | 1,200E-02 | 1000 | 5,807E-05 | 1700 | 4,356E-01 | 3200 | 4,000E-04 | 4700 | 5,140E-04 |
| 410 | 7,190E-01 | 710 | 6,990E-03 | 1010 | 7,070E-05 | 1750 | 5,018E-01 | 3250 | 3,412E-04 | 4750 | 5,000E-04 |
| 420 | 7,510E-01 | 720 | 4,000E-03 | 1020 | 8,810E-05 | 1800 | 5,600E-01 | 3300 | 3,097E-04 | 4800 | 4,699E-04 |
| 430 | 7,800E-01 | 730 | 2,294E-03 | 1030 | 1,098E-04 | 1850 | 6,191E-01 | 3350 | 2,871E-04 | 4850 | 4,266E-04 |
| 440 | 8,060E-01 | 740 | 1,333E-03 | 1040 | 1,337E-04 | 1900 | 6,600E-01 | 3400 | 2,793E-04 | 4900 | 4,169E-04 |
| 450 | 8,300E-01 | 750 | 7,750E-04 | 1050 | 1,622E-04 | 1950 | 7,070E-01 | 3450 | 3,034E-04 | 4950 | 4,477E-04 |
| 460 | 8,530E-01 | 760 | 4,570E-04 | 1060 | 2,000E-04 | 2000 | 7,430E-01 | 3500 | 3,606E-04 | 5000 | 5,000E-04 |
| 470 | 8,720E-01 | 770 | 2,754E-04 | 1070 | 2,573E-04 | 2050 | 7,631E-01 | 3550 | 4,634E-04 | 5050 | 5,000E-04 |
| 480 | 8,850E-01 | 780 | 1,734E-04 | 1080 | 3,317E-04 | 2100 | 7,807E-01 | 3600 | 6,000E-04 | 5100 | 4,198E-04 |
| 490 | 8,991E-01 | 790 | 1,109E-04 | 1090 | 4,133E-04 | 2150 | 7,891E-01 | 3650 | 8,185E-04 | 5150 | 2,931E-04 |

# Data Sheet

## BG25

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,920 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (334 nm) | | ≤ | 0,8 |
| $\tau_i$ (405 nm) | | ≥ | 0,93 |
| $\tau_i$ (488 nm) | | ≤ | 0,39 |
| $\tau_i$ (725 nm) | | ≤ | 0,36 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,51 |
| $n_d$ (587,6 nm) | | = | 1,51 |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | 0,8738 | | |
| $B_2$ | 0,3772 | | |
| $B_3$ | 1,1188 | | |
| $C_1$ | 9,601E-03 | µm² | |
| $C_2$ | 1,1147E-02 | µm² | |
| $C_3$ | 145,493 | µm² | |
| **Internal quality** | | | |
| Bubble class | 1 | | |

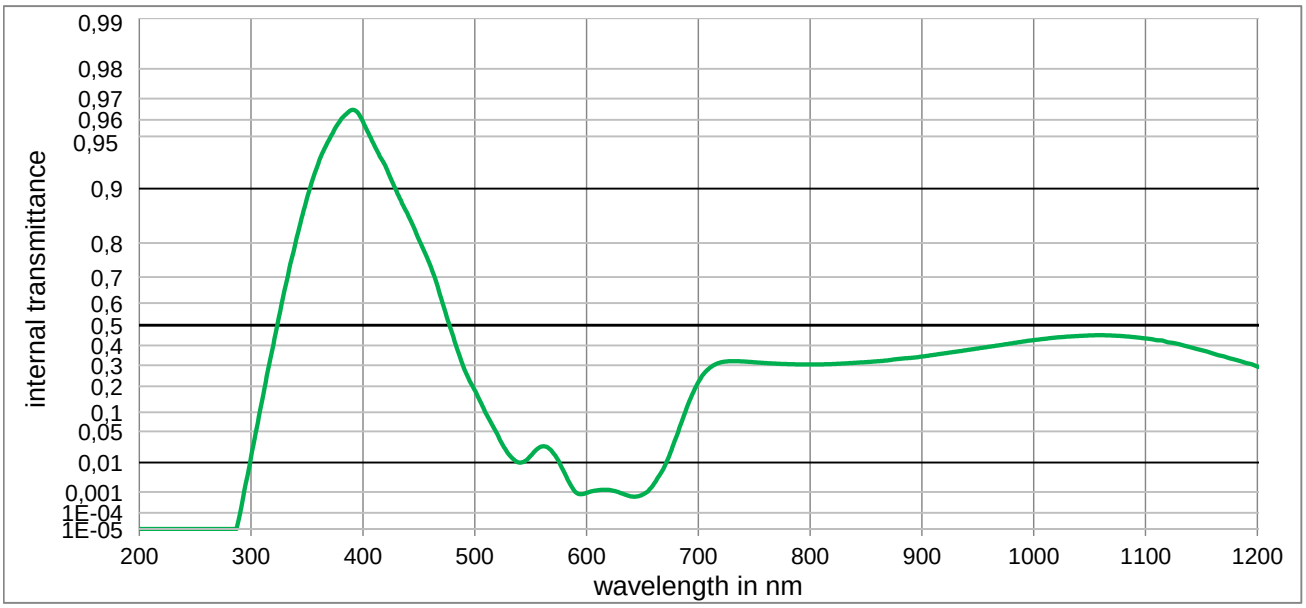
| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 2,56 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 434 |

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

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Robust glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

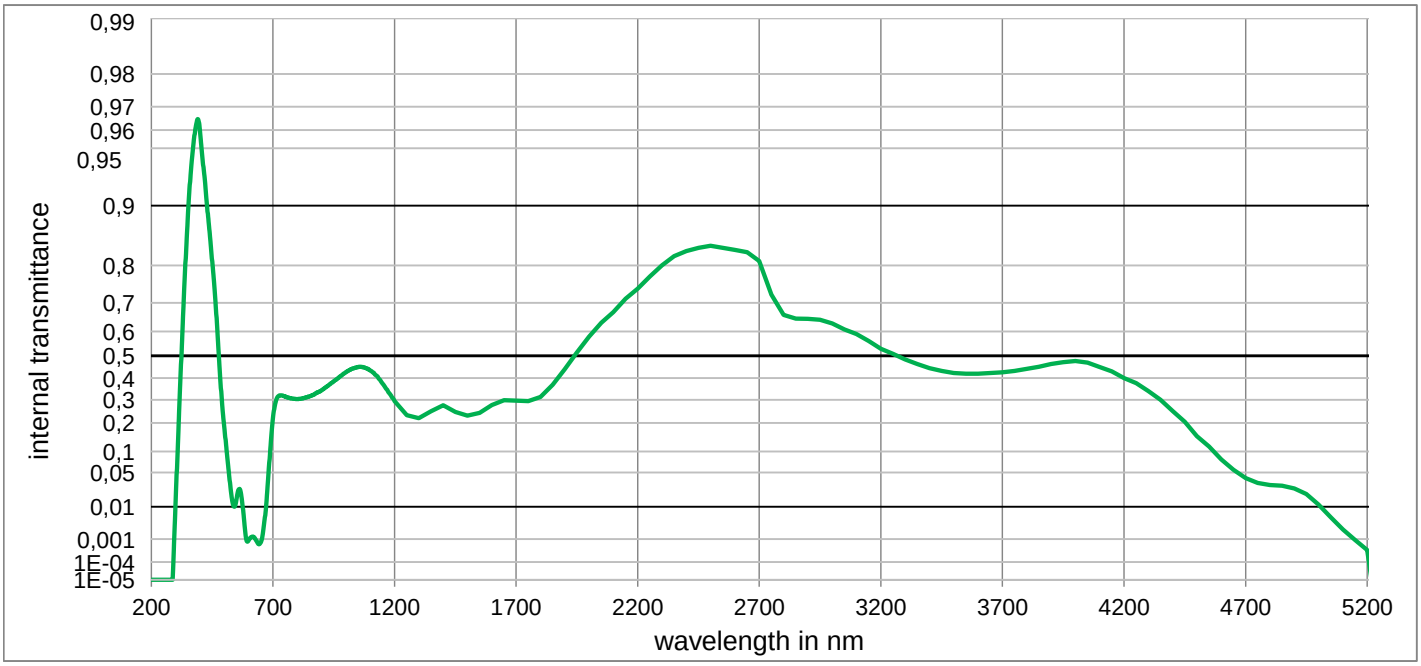
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,150 | 0,153 | 0,157 |
| | y | 0,055 | 0,027 | 0,021 |
| | Y | 5,0 | 1,8 | 1,1 |
| | $\lambda_d$ | 463 nm | 455 nm | 451 nm |
| | $P_e$ | 0,934 | 0,985 | 0,993 |
| Illuminant A | x | 0,155 | 0,151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

| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## BG25




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 1,830E-01 | 800 | 3,037E-01 | 1100 | 4,350E-01 | 2200 | 7,421E-01 | 3700 | 4,262E-01 |
| 210 | < | 1,0E-05 | 510 | 9,700E-02 | 810 | 3,043E-01 | 1110 | 4,263E-01 | 2250 | 7,743E-01 | 3750 | 4,322E-01 |
| 220 | < | 1,0E-05 | 520 | 4,500E-02 | 820 | 3,060E-01 | 1120 | 4,160E-01 | 2300 | 8,000E-01 | 3800 | 4,424E-01 |
| 230 | < | 1,0E-05 | 530 | 1,700E-02 | 830 | 3,089E-01 | 1130 | 4,069E-01 | 2350 | 8,200E-01 | 3850 | 4,517E-01 |
| 240 | < | 1,0E-05 | 540 | 1,000E-02 | 840 | 3,122E-01 | 1140 | 3,915E-01 | 2400 | 8,300E-01 | 3900 | 4,636E-01 |
| 250 | < | 1,0E-05 | 550 | 1,500E-02 | 850 | 3,157E-01 | 1150 | 3,759E-01 | 2450 | 8,363E-01 | 3950 | 4,721E-01 |
| 260 | < | 1,0E-05 | 560 | 2,499E-02 | 860 | 3,200E-01 | 1160 | 3,598E-01 | 2500 | 8,400E-01 | 4000 | 4,772E-01 |
| 270 | < | 1,0E-05 | 570 | 1,800E-02 | 870 | 3,250E-01 | 1170 | 3,452E-01 | 2550 | 8,363E-01 | 4050 | 4,700E-01 |
| 280 | < | 1,0E-05 | 580 | 5,153E-03 | 880 | 3,320E-01 | 1180 | 3,280E-01 | 2600 | 8,321E-01 | 4100 | 4,500E-01 |
| 290 | | 8,5E-05 | 590 | 1,014E-03 | 890 | 3,368E-01 | 1190 | 3,108E-01 | 2650 | 8,278E-01 | 4150 | 4,305E-01 |
| 300 | | 1,4E-02 | 600 | 9,099E-04 | 900 | 3,438E-01 | 1200 | 2,943E-01 | 2700 | 8,100E-01 | 4200 | 4,000E-01 |
| 310 | | 1,4E-01 | 610 | 1,170E-03 | 910 | 3,517E-01 | 1250 | 2,318E-01 | 2750 | 7,251E-01 | 4250 | 3,761E-01 |
| 320 | | 4,080E-01 | 620 | 1,212E-03 | 920 | 3,598E-01 | 1300 | 2,200E-01 | 2800 | 6,600E-01 | 4300 | 3,400E-01 |
| 330 | | 6,550E-01 | 630 | 9,256E-04 | 930 | 3,683E-01 | 1350 | 2,496E-01 | 2850 | 6,478E-01 | 4350 | 3,006E-01 |
| 340 | | 8,050E-01 | 640 | 6,433E-04 | 940 | 3,764E-01 | 1400 | 2,751E-01 | 2900 | 6,470E-01 | 4400 | 2,500E-01 |
| 350 | | 8,870E-01 | 650 | 7,603E-04 | 950 | 3,850E-01 | 1450 | 2,462E-01 | 2950 | 6,436E-01 | 4450 | 2,046E-01 |
| 360 | | 9,280E-01 | 660 | 1,998E-03 | 960 | 3,932E-01 | 1500 | 2,300E-01 | 3000 | 6,300E-01 | 4500 | 1,500E-01 |
| 370 | | 9,480E-01 | 670 | 7,995E-03 | 970 | 4,017E-01 | 1550 | 2,420E-01 | 3050 | 6,079E-01 | 4550 | 1,146E-01 |
| 380 | | 9,600E-01 | 680 | 3,800E-02 | 980 | 4,106E-01 | 1600 | 2,768E-01 | 3100 | 5,900E-01 | 4600 | 7,834E-02 |
| 390 | | 9,650E-01 | 690 | 1,180E-01 | 990 | 4,192E-01 | 1650 | 2,980E-01 | 3150 | 5,621E-01 | 4650 | 5,508E-02 |
| 400 | | 9,590E-01 | 700 | 2,190E-01 | 1000 | 4,270E-01 | 1700 | 2,963E-01 | 3200 | 5,300E-01 | 4700 | 4,000E-02 |
| 410 | | 9,440E-01 | 710 | 2,860E-01 | 1010 | 4,338E-01 | 1750 | 2,946E-01 | 3250 | 5,086E-01 | 4750 | 3,296E-02 |
| 420 | | 9,260E-01 | 720 | 3,140E-01 | 1020 | 4,398E-01 | 1800 | 3,133E-01 | 3300 | 4,840E-01 | 4800 | 3,000E-02 |
| 430 | | 8,970E-01 | 730 | 3,205E-01 | 1030 | 4,442E-01 | 1850 | 3,693E-01 | 3350 | 4,636E-01 | 4850 | 2,924E-02 |
| 440 | | 8,610E-01 | 740 | 3,190E-01 | 1040 | 4,475E-01 | 1900 | 4,400E-01 | 3400 | 4,449E-01 | 4900 | 2,576E-02 |
| 450 | | 8,090E-01 | 750 | 3,150E-01 | 1050 | 4,501E-01 | 1950 | 5,145E-01 | 3450 | 4,330E-01 | 4950 | 1,968E-02 |
| 460 | | 7,400E-01 | 760 | 3,109E-01 | 1060 | 4,513E-01 | 2000 | 5,800E-01 | 3500 | 4,228E-01 | 5000 | 1,132E-02 |
| 470 | | 6,200E-01 | 770 | 3,079E-01 | 1070 | 4,498E-01 | 2050 | 6,325E-01 | 3550 | 4,200E-01 | 5050 | 5,236E-03 |
| 480 | | 4,570E-01 | 780 | 3,057E-01 | 1080 | 4,465E-01 | 2100 | 6,700E-01 | 3600 | 4,200E-01 | 5100 | 2,178E-03 |
| 490 | | 2,910E-01 | 790 | 3,043E-01 | 1090 | 4,416E-01 | 2150 | 7,124E-01 | 3650 | 4,228E-01 | 5150 | 9,397E-04 |

# Data Sheet

## BG38

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,916 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (350 nm) | ≥ | 0,8 | |
| $\tau_i$ (405 nm) | ≥ | 0,93 | |
| $\tau_i$ (514 nm) | ≥ | 0,95 | |
| $\tau_i$ (633 nm) | ≤ | 0,67 | |
| $\tau_i$ (694 nm) | ≤ | 0,32 | |
| $\tau_i$ (1060 nm) | ≤ | 0,06 | |
| **Refractive indices** | | | |
| $n_d$ (587,6 nm) | = | 1,53 | |
| **Sellmeier coefficients** | | | |
| on request | | | |
| **Internal quality** | | | |
| Bubble class | | 2 | |

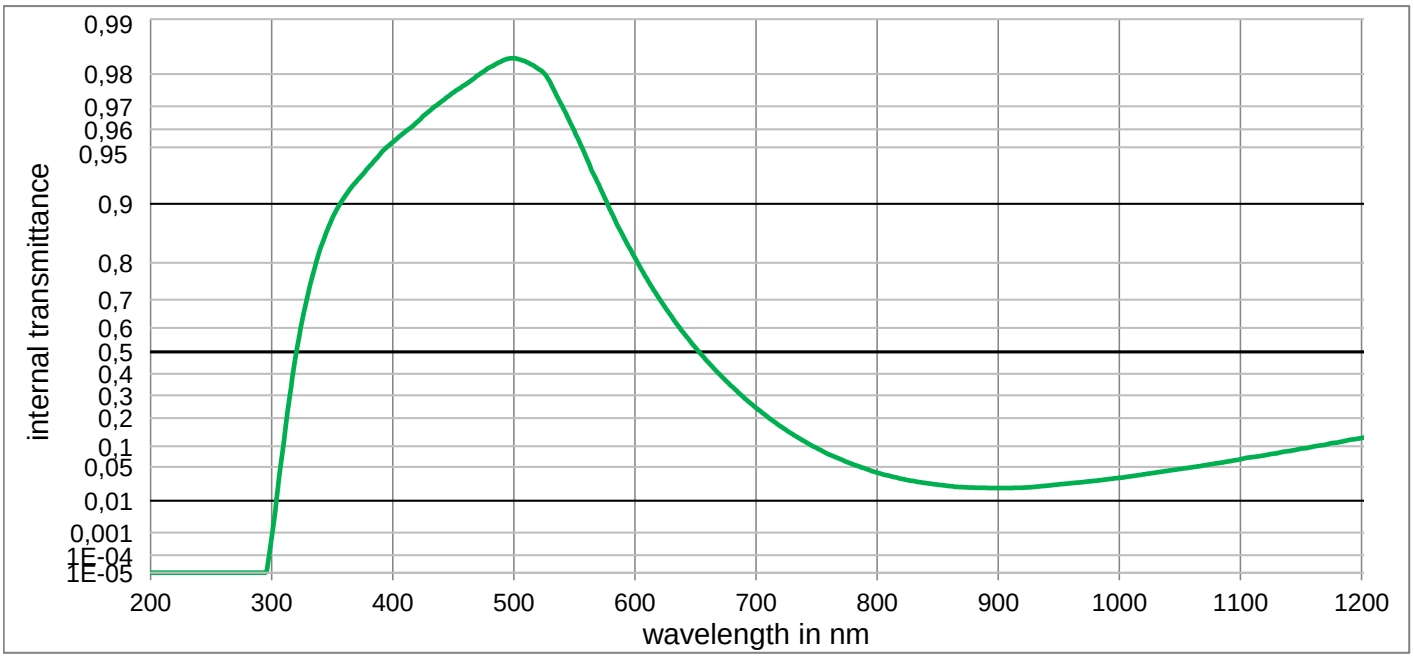
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 1,00 mm |
| **Density** | | |
| ρ | = | 2,66 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | = | 472 |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 0 |
| SR class | = | 2 |
| AR class | = | 2 |
| **Resistance against humidity** | | |
| Sensitive glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

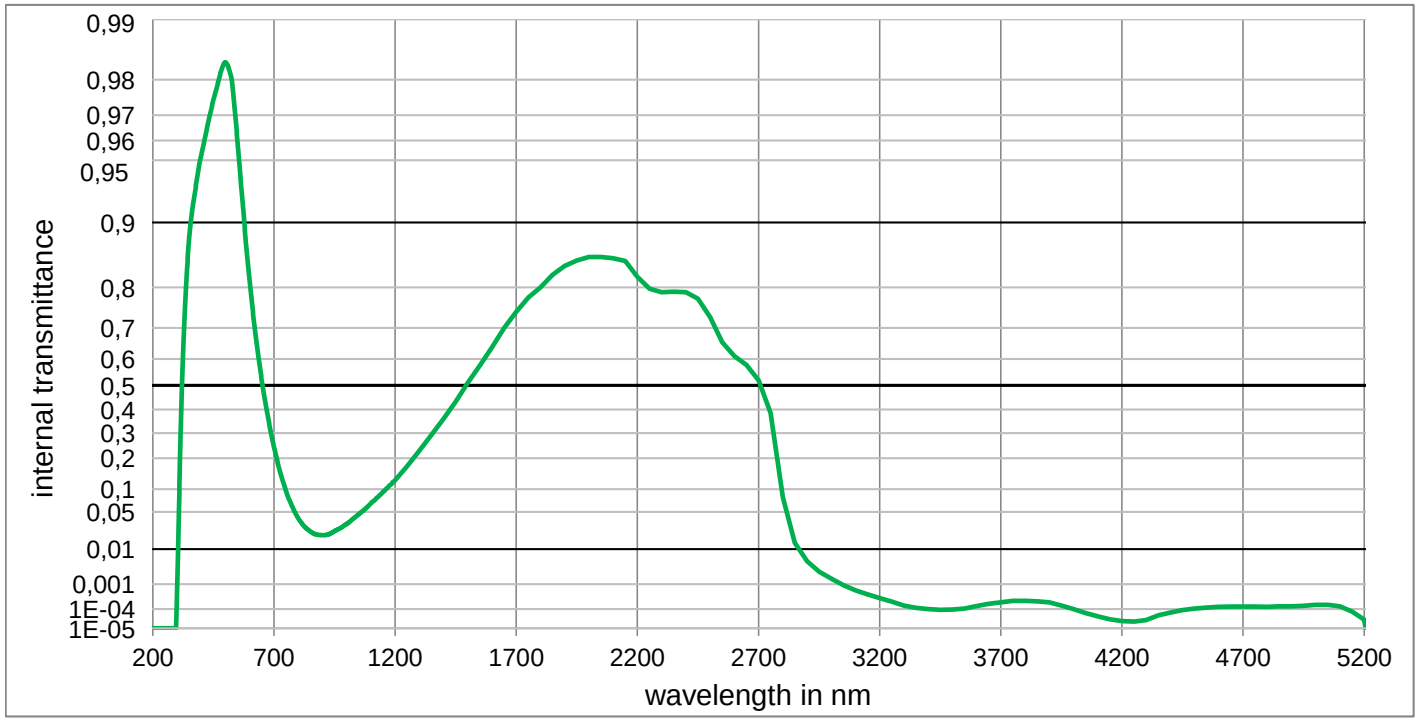
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,288 | 0,268 | 0,253 |
| | y | 0,328 | 0,326 | 0,323 |
| | Y | 83,2 | 76,4 | 70,8 |
| | $\lambda_d$ | 491 nm | 491 nm | 490 nm |
| | $P_e$ | 0,092 | 0,164 | 0,223 |
| Illuminant A | x | 0,413 | 0,384 | 0,360 |
| | y | 0,419 | 0,427 | 0,433 |
| | Y | 79,7 | 70,7 | 63,7 |
| | $\lambda_d$ | 501 nm | 500 nm | 500 nm |
| | $P_e$ | 0,078 | 0,144 | 0,200 |

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## BG38




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,836E-01 | 800 | 4,002E-02 | 1100 | 6,593E-02 | 2200 | 8,208E-01 | 3700 | 2,000E-04 |
| 210 | < 1,0E-05 | 510 | 9,829E-01 | 810 | 3,491E-02 | 1110 | 7,111E-02 | 2250 | 7,973E-01 | 3750 | 2,296E-04 |
| 220 | < 1,0E-05 | 520 | 9,813E-01 | 820 | 3,080E-02 | 1120 | 7,524E-02 | 2300 | 7,897E-01 | 3800 | 2,317E-04 |
| 230 | < 1,0E-05 | 530 | 9,777E-01 | 830 | 2,761E-02 | 1130 | 8,054E-02 | 2350 | 7,907E-01 | 3850 | 2,193E-04 |
| 240 | < 1,0E-05 | 540 | 9,700E-01 | 840 | 2,539E-02 | 1140 | 8,631E-02 | 2400 | 7,897E-01 | 3900 | 2,000E-04 |
| 250 | < 1,0E-05 | 550 | 9,590E-01 | 850 | 2,341E-02 | 1150 | 9,319E-02 | 2450 | 7,756E-01 | 3950 | 1,449E-04 |
| 260 | < 1,0E-05 | 560 | 9,430E-01 | 860 | 2,183E-02 | 1160 | 9,869E-02 | 2500 | 7,300E-01 | 4000 | 1,000E-04 |
| 270 | < 1,0E-05 | 570 | 9,210E-01 | 870 | 2,077E-02 | 1170 | 1,044E-01 | 2550 | 6,569E-01 | 4050 | 6,471E-05 |
| 280 | < 1,0E-05 | 580 | 8,910E-01 | 880 | 2,026E-02 | 1180 | 1,113E-01 | 2600 | 6,100E-01 | 4100 | 4,436E-05 |
| 290 | < 1,0E-05 | 590 | 8,540E-01 | 890 | 2,000E-02 | 1190 | 1,198E-01 | 2650 | 5,786E-01 | 4150 | 3,090E-05 |
| 300 | 6,5E-04 | 600 | 8,110E-01 | 900 | 1,991E-02 | 1200 | 1,258E-01 | 2700 | 5,200E-01 | 4200 | 2,500E-05 |
| 310 | 1,1E-01 | 610 | 7,600E-01 | 910 | 1,996E-02 | 1250 | 1,715E-01 | 2750 | 3,854E-01 | 4250 | 2,410E-05 |
| 320 | 4,870E-01 | 620 | 7,040E-01 | 920 | 2,020E-02 | 1300 | 2,281E-01 | 2800 | 8,000E-02 | 4300 | 2,818E-05 |
| 330 | 7,180E-01 | 630 | 6,440E-01 | 930 | 2,103E-02 | 1350 | 2,931E-01 | 2850 | 1,384E-02 | 4350 | 5,047E-05 |
| 340 | 8,290E-01 | 640 | 5,810E-01 | 940 | 2,227E-02 | 1400 | 3,600E-01 | 2900 | 5,000E-03 | 4400 | 6,776E-05 |
| 350 | 8,813E-01 | 650 | 5,180E-01 | 950 | 2,371E-02 | 1450 | 4,335E-01 | 2950 | 2,547E-03 | 4450 | 9,036E-05 |
| 360 | 9,077E-01 | 660 | 4,560E-01 | 960 | 2,505E-02 | 1500 | 5,100E-01 | 3000 | 1,531E-03 | 4500 | 1,047E-04 |
| 370 | 9,239E-01 | 670 | 3,970E-01 | 970 | 2,650E-02 | 1550 | 5,768E-01 | 3050 | 9,290E-04 | 4550 | 1,169E-04 |
| 380 | 9,359E-01 | 680 | 3,410E-01 | 980 | 2,805E-02 | 1600 | 6,400E-01 | 3100 | 6,000E-04 | 4600 | 1,247E-04 |
| 390 | 9,460E-01 | 690 | 2,890E-01 | 990 | 3,000E-02 | 1650 | 7,000E-01 | 3150 | 4,236E-04 | 4650 | 1,294E-04 |
| 400 | 9,530E-01 | 700 | 2,430E-01 | 1000 | 3,196E-02 | 1700 | 7,436E-01 | 3200 | 3,000E-04 | 4700 | 1,294E-04 |
| 410 | 9,587E-01 | 710 | 2,030E-01 | 1010 | 3,434E-02 | 1750 | 7,784E-01 | 3250 | 2,133E-04 | 4750 | 1,282E-04 |
| 420 | 9,634E-01 | 720 | 1,680E-01 | 1020 | 3,707E-02 | 1800 | 8,000E-01 | 3300 | 1,422E-04 | 4800 | 1,259E-04 |
| 430 | 9,680E-01 | 730 | 1,390E-01 | 1030 | 4,006E-02 | 1850 | 8,246E-01 | 3350 | 1,138E-04 | 4850 | 1,330E-04 |
| 440 | 9,717E-01 | 740 | 1,150E-01 | 1040 | 4,300E-02 | 1900 | 8,400E-01 | 3400 | 1,000E-04 | 4900 | 1,330E-04 |
| 450 | 9,748E-01 | 750 | 9,500E-02 | 1050 | 4,610E-02 | 1950 | 8,491E-01 | 3450 | 9,120E-05 | 4950 | 1,409E-04 |
| 460 | 9,772E-01 | 760 | 7,800E-02 | 1060 | 4,929E-02 | 2000 | 8,548E-01 | 3500 | 9,550E-05 | 5000 | 1,560E-04 |
| 470 | 9,796E-01 | 770 | 6,600E-02 | 1070 | 5,297E-02 | 2050 | 8,548E-01 | 3550 | 1,057E-04 | 5050 | 1,531E-04 |
| 480 | 9,816E-01 | 780 | 5,500E-02 | 1080 | 5,700E-02 | 2100 | 8,529E-01 | 3600 | 1,358E-04 | 5100 | 1,318E-04 |
| 490 | 9,830E-01 | 790 | 4,700E-02 | 1090 | 6,123E-02 | 2150 | 8,482E-01 | 3650 | 1,694E-04 | 5150 | 7,516E-05 |

# Data Sheet

## BG39

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,914 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (350 nm) | ≥ | 0,6 | |
| $\tau_i$ (405 nm) | ≥ | 0,85 | |
| $\tau_i$ (514 nm) | ≥ | 0,93 | |
| $\tau_i$ (633 nm) | ≤ | 0,3 | |
| $\tau_i$ (694 nm) | ≤ | 0,03 | |
| $\tau_i$ (1060 nm) | ≤ | 0,001 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,54 | |
| $n_e$ (546 nm) | = | 1,54 | |
| $n_d$ (587,6 nm) | = | 1,54 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,4382 | |
| $B_2$ | | 0,8900 | |
| $B_3$ | | 7,4825 | |
| $C_1$ | | 2,508E-02 | µm² |
| $C_2$ | | 1,2201E-04 | µm² |
| $C_3$ | | 973,996 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

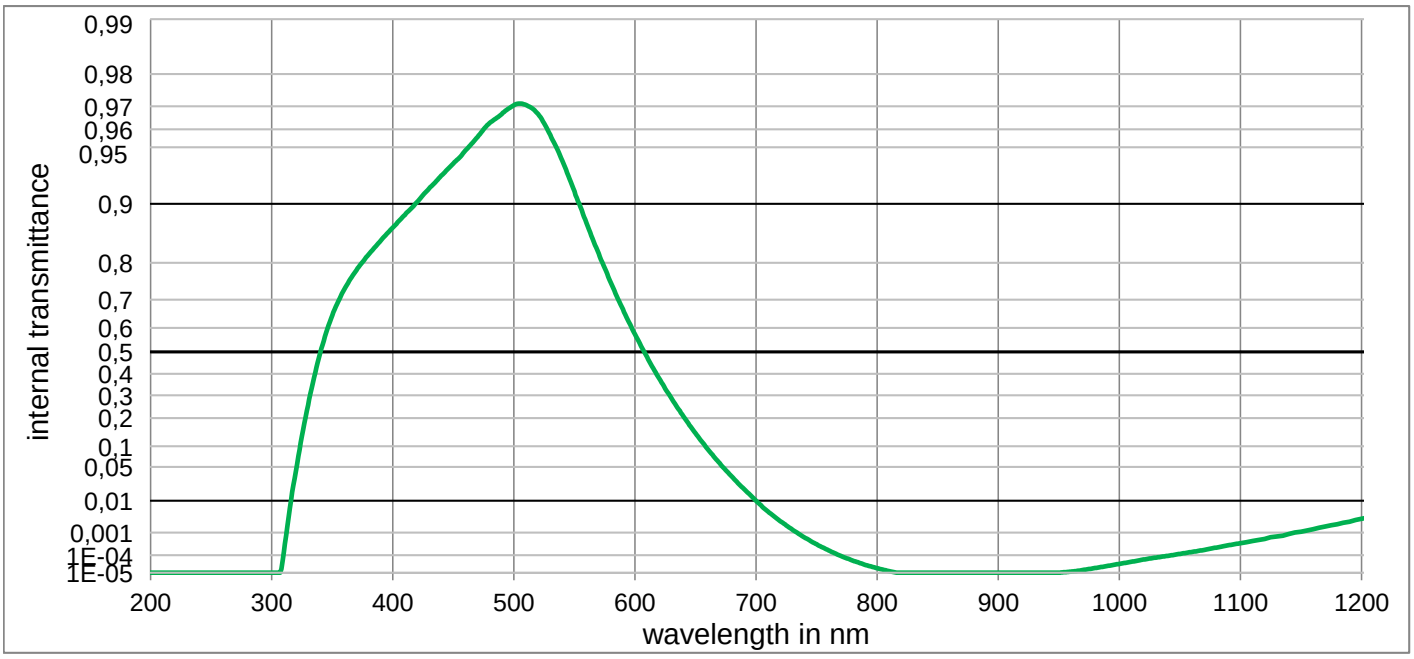
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = | 322 °C |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 11,6 |
| $\alpha_{(20°C/200°C)}$ | = | 13,1 |

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 0 |
| SR class | = | 5.1 |
| AR class | = | 3 |
| **Resistance against humidity** | | |
| Delicate glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

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

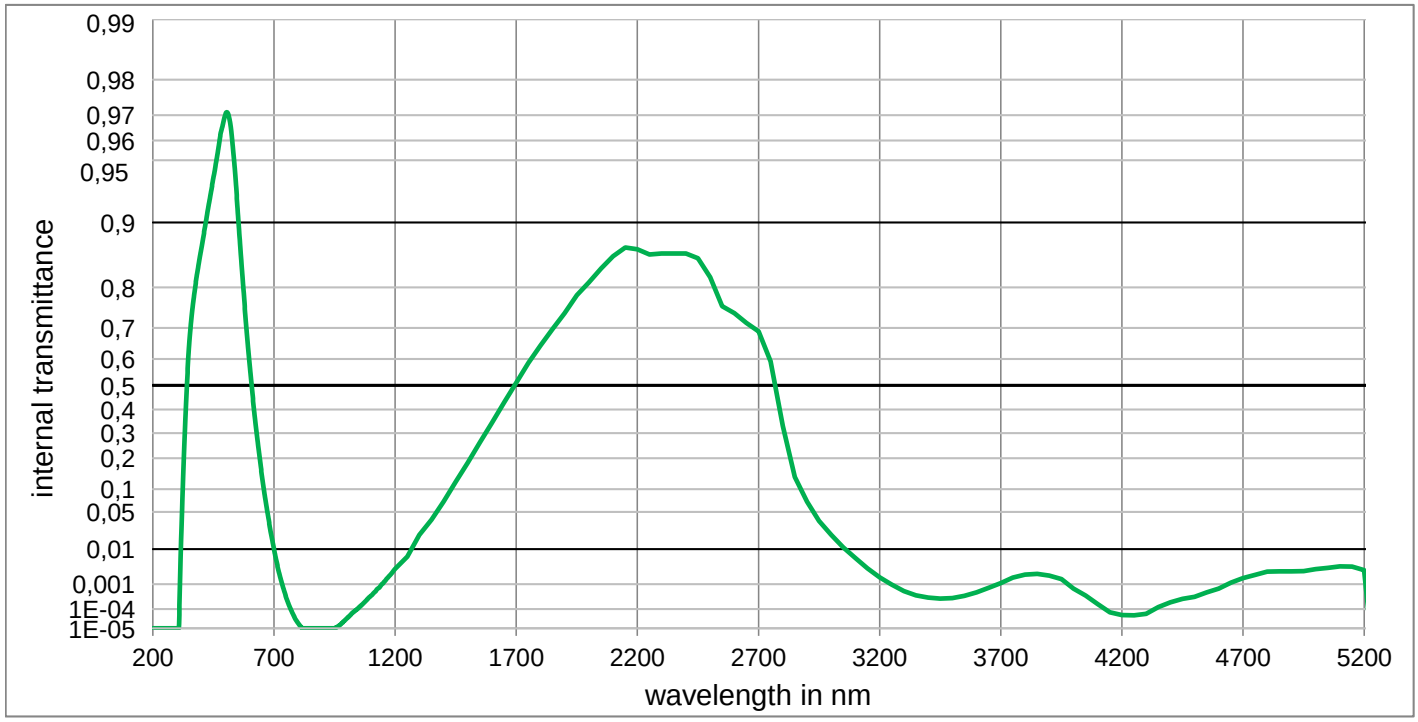
| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG39




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,704E-01 | 800 | 1,914E-05 | 1100 | 3,654E-04 | 2200 | 8,661E-01 | 3700 | 1,086E-03 |
| 210 | < 1,0E-05 | 510 | 9,705E-01 | 810 | 1,254E-05 | 1110 | 4,625E-04 | 2250 | 8,585E-01 | 3750 | 1,648E-03 |
| 220 | < 1,0E-05 | 520 | 9,670E-01 | 820 | < 1,000E-05 | 1120 | 5,538E-04 | 2300 | 8,600E-01 | 3800 | 2,075E-03 |
| 230 | < 1,0E-05 | 530 | 9,571E-01 | 830 | < 1,000E-05 | 1130 | 7,037E-04 | 2350 | 8,600E-01 | 3850 | 2,173E-03 |
| 240 | < 1,0E-05 | 540 | 9,410E-01 | 840 | < 1,000E-05 | 1140 | 8,786E-04 | 2400 | 8,600E-01 | 3900 | 1,910E-03 |
| 250 | < 1,0E-05 | 550 | 9,140E-01 | 850 | < 1,000E-05 | 1150 | 1,070E-03 | 2450 | 8,529E-01 | 3950 | 1,476E-03 |
| 260 | < 1,0E-05 | 560 | 8,740E-01 | 860 | < 1,000E-05 | 1160 | 1,330E-03 | 2500 | 8,200E-01 | 4000 | 7,000E-04 |
| 270 | < 1,0E-05 | 570 | 8,200E-01 | 870 | < 1,000E-05 | 1170 | 1,667E-03 | 2550 | 7,577E-01 | 4050 | 3,784E-04 |
| 280 | < 1,0E-05 | 580 | 7,510E-01 | 880 | < 1,000E-05 | 1180 | 2,012E-03 | 2600 | 7,400E-01 | 4100 | 1,663E-04 |
| 290 | < 1,0E-05 | 590 | 6,680E-01 | 890 | < 1,000E-05 | 1190 | 2,445E-03 | 2650 | 7,143E-01 | 4150 | 6,966E-05 |
| 300 | < 1,0E-05 | 600 | 5,750E-01 | 900 | < 1,000E-05 | 1200 | 3,055E-03 | 2700 | 6,900E-01 | 4200 | 5,188E-05 |
| 310 | 1,5E-04 | 610 | 4,760E-01 | 910 | < 1,000E-05 | 1250 | 6,600E-03 | 2750 | 5,918E-01 | 4250 | 4,955E-05 |
| 320 | 4,200E-02 | 620 | 3,780E-01 | 920 | < 1,000E-05 | 1300 | 2,000E-02 | 2800 | 3,300E-01 | 4300 | 6,000E-05 |
| 330 | 2,560E-01 | 630 | 2,870E-01 | 930 | < 1,000E-05 | 1350 | 3,770E-02 | 2850 | 1,355E-01 | 4350 | 1,236E-04 |
| 340 | 4,940E-01 | 640 | 2,070E-01 | 940 | < 1,000E-05 | 1400 | 7,000E-02 | 2900 | 7,000E-02 | 4400 | 2,000E-04 |
| 350 | 6,470E-01 | 650 | 1,420E-01 | 950 | 1,008E-05 | 1450 | 1,206E-01 | 2950 | 3,614E-02 | 4450 | 2,767E-04 |
| 360 | 7,320E-01 | 660 | 9,200E-02 | 960 | 1,175E-05 | 1500 | 1,838E-01 | 3000 | 2,000E-02 | 4500 | 3,388E-04 |
| 370 | 7,830E-01 | 670 | 5,700E-02 | 970 | 1,482E-05 | 1550 | 2,620E-01 | 3050 | 1,096E-02 | 4550 | 5,000E-04 |
| 380 | 8,180E-01 | 680 | 3,371E-02 | 980 | 1,948E-05 | 1600 | 3,440E-01 | 3100 | 6,000E-03 | 4600 | 7,000E-04 |
| 390 | 8,450E-01 | 690 | 1,900E-02 | 990 | 2,563E-05 | 1650 | 4,307E-01 | 3150 | 3,148E-03 | 4650 | 1,138E-03 |
| 400 | 8,670E-01 | 700 | 1,000E-02 | 1000 | 3,406E-05 | 1700 | 5,100E-01 | 3200 | 1,694E-03 | 4700 | 1,589E-03 |
| 410 | 8,860E-01 | 710 | 5,032E-03 | 1010 | 4,488E-05 | 1750 | 5,862E-01 | 3250 | 9,638E-04 | 4750 | 2,037E-03 |
| 420 | 9,020E-01 | 720 | 2,553E-03 | 1020 | 5,930E-05 | 1800 | 6,455E-01 | 3300 | 5,585E-04 | 4800 | 2,523E-03 |
| 430 | 9,170E-01 | 730 | 1,289E-03 | 1030 | 7,490E-05 | 1850 | 6,974E-01 | 3350 | 3,855E-04 | 4850 | 2,570E-03 |
| 440 | 9,290E-01 | 740 | 6,470E-04 | 1040 | 9,240E-05 | 1900 | 7,400E-01 | 3400 | 3,148E-04 | 4900 | 2,594E-03 |
| 450 | 9,390E-01 | 750 | 3,320E-04 | 1050 | 1,167E-04 | 1950 | 7,831E-01 | 3450 | 2,871E-04 | 4950 | 2,642E-03 |
| 460 | 9,480E-01 | 760 | 1,712E-04 | 1060 | 1,452E-04 | 2000 | 8,100E-01 | 3500 | 3,000E-04 | 5000 | 3,000E-03 |
| 470 | 9,560E-01 | 770 | 9,260E-05 | 1070 | 1,828E-04 | 2050 | 8,359E-01 | 3550 | 3,648E-04 | 5050 | 3,296E-03 |
| 480 | 9,630E-01 | 780 | 5,137E-05 | 1080 | 2,333E-04 | 2100 | 8,557E-01 | 3600 | 5,093E-04 | 5100 | 3,614E-03 |
| 490 | 9,670E-01 | 790 | 3,007E-05 | 1090 | 2,972E-04 | 2150 | 8,689E-01 | 3650 | 7,430E-04 | 5150 | 3,548E-03 |

# Data Sheet

## BG40

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,916 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (350 nm) | | ≥ | 0,8 |
| $\tau_i$ (405 nm) | | ≥ | 0,93 |
| $\tau_i$ (514 nm) | | ≥ | 0,97 |
| $\tau_i$ (633 nm) | | ≤ | 0,57 |
| $\tau_i$ (694 nm) | | ≤ | 0,16 |
| $\tau_i$ (1060 nm) | | ≤ | 0,02 |
| | | | |
| | | | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,53 |
| $n_d$ (587,6 nm) | | = | 1,53 |
| | | | |
| **Sellmeier coefficients** | | | |
| valid from 435 nm to 1550 nm | | | |
| $B_1$ | 0,9300 | | |
| $B_2$ | 0,3779 | | |
| $B_3$ | 1,0478 | | |
| $C_1$ | 8,617E-03 | µm² | |
| $C_2$ | 1,0398E-02 | µm² | |
| $C_3$ | 149,651 | µm² | |
| **Internal quality** | | | |
| Bubble class | 1 | | |

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

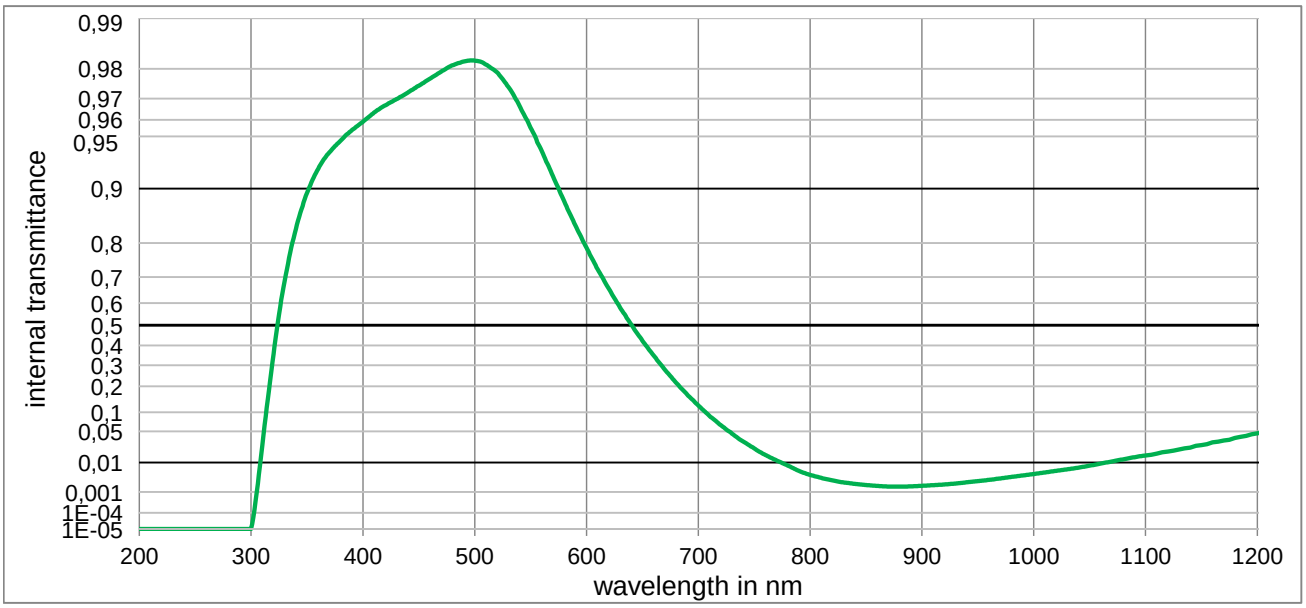
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 313 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 11,9 |
| | | | |
| $\alpha_{(20°C/200°C)}$ | | = | 13,7 |
| | | | |
| | | | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 5.1 |
| | AR class | = | 3 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,283 | 0,262 | 0,246 |
| | y | 0,327 | 0,324 | 0,321 |
| | Y | 82,1 | 74,8 | 69,0 |
| | $\lambda_d$ | 491 nm | 490 nm | 490 nm |
| | $P_e$ | 0,108 | 0,188 | 0,250 |
| Illuminant A | x | 0,406 | 0,374 | 0,348 |
| | y | 0,421 | 0,430 | 0,436 |
| | Y | 78,0 | 68,4 | 61,3 |
| | $\lambda_d$ | 501 nm | 500 nm | 500 nm |
| | $P_e$ | 0,094 | 0,168 | 0,227 |

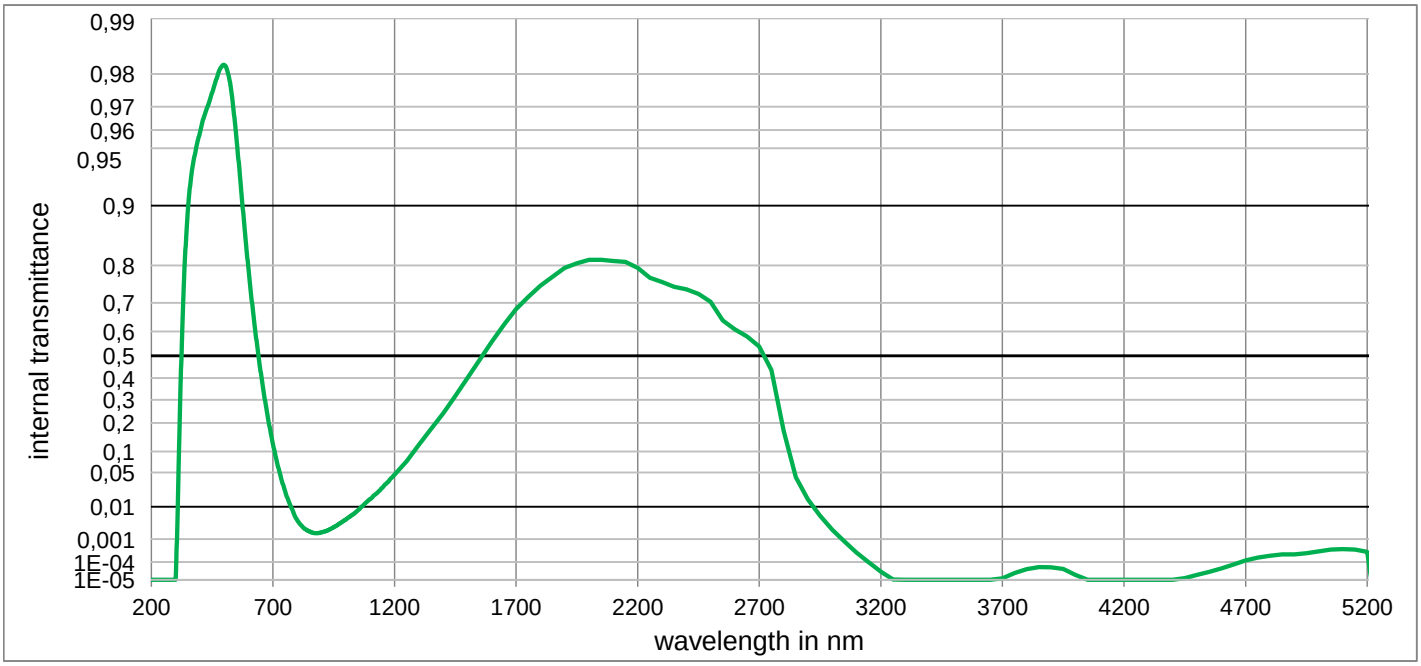
| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG40




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,821E-01 | 800 | 4,252E-03 | 1100 | 1,533E-02 | 2200 | 7,945E-01 | 3700 | 1,213E-05 |
| 210 | < 1,0E-05 | 510 | 9,812E-01 | 810 | 3,366E-03 | 1110 | 1,712E-02 | 2250 | 7,709E-01 | 3750 | 2,518E-05 |
| 220 | < 1,0E-05 | 520 | 9,790E-01 | 820 | 2,780E-03 | 1120 | 1,901E-02 | 2300 | 7,600E-01 | 3800 | 4,169E-05 |
| 230 | < 1,0E-05 | 530 | 9,745E-01 | 830 | 2,340E-03 | 1130 | 2,123E-02 | 2350 | 7,473E-01 | 3850 | 5,395E-05 |
| 240 | < 1,0E-05 | 540 | 9,670E-01 | 840 | 2,062E-03 | 1140 | 2,354E-02 | 2400 | 7,400E-01 | 3900 | 5,333E-05 |
| 250 | < 1,0E-05 | 550 | 9,556E-01 | 850 | 1,880E-03 | 1150 | 2,665E-02 | 2450 | 7,266E-01 | 3950 | 4,335E-05 |
| 260 | < 1,0E-05 | 560 | 9,390E-01 | 860 | 1,734E-03 | 1160 | 3,051E-02 | 2500 | 7,030E-01 | 4000 | 2,000E-05 |
| 270 | < 1,0E-05 | 570 | 9,150E-01 | 870 | 1,644E-03 | 1170 | 3,350E-02 | 2550 | 6,408E-01 | 4050 | < 1,000E-05 |
| 280 | < 1,0E-05 | 580 | 8,820E-01 | 880 | 1,622E-03 | 1180 | 3,747E-02 | 2600 | 6,079E-01 | 4100 | < 1,000E-05 |
| 290 | < 1,0E-05 | 590 | 8,400E-01 | 890 | 1,670E-03 | 1190 | 4,112E-02 | 2650 | 5,805E-01 | 4150 | < 1,000E-05 |
| 300 | < 1,0E-05 | 600 | 7,880E-01 | 900 | 1,752E-03 | 1200 | 4,588E-02 | 2700 | 5,400E-01 | 4200 | < 1,000E-05 |
| 310 | 2,6E-02 | 610 | 7,260E-01 | 910 | 1,850E-03 | 1250 | 7,450E-02 | 2750 | 4,363E-01 | 4250 | < 1,000E-05 |
| 320 | 3,560E-01 | 620 | 6,570E-01 | 920 | 1,964E-03 | 1300 | 1,200E-01 | 2800 | 1,700E-01 | 4300 | < 1,000E-05 |
| 330 | 6,860E-01 | 630 | 5,810E-01 | 930 | 2,136E-03 | 1350 | 1,762E-01 | 2850 | 4,150E-02 | 4350 | < 1,000E-05 |
| 340 | 8,320E-01 | 640 | 5,030E-01 | 940 | 2,360E-03 | 1400 | 2,400E-01 | 2900 | 1,510E-02 | 4400 | < 1,000E-05 |
| 350 | 8,940E-01 | 650 | 4,240E-01 | 950 | 2,607E-03 | 1450 | 3,185E-01 | 2950 | 5,754E-03 | 4450 | 1,256E-05 |
| 360 | 9,230E-01 | 660 | 3,490E-01 | 960 | 2,880E-03 | 1500 | 4,000E-01 | 3000 | 2,153E-03 | 4500 | 2,000E-05 |
| 370 | 9,380E-01 | 670 | 2,790E-01 | 970 | 3,228E-03 | 1550 | 4,825E-01 | 3050 | 8,072E-04 | 4550 | 2,958E-05 |
| 380 | 9,470E-01 | 680 | 2,170E-01 | 980 | 3,631E-03 | 1600 | 5,600E-01 | 3100 | 2,818E-04 | 4600 | 4,645E-05 |
| 390 | 9,540E-01 | 690 | 1,650E-01 | 990 | 4,064E-03 | 1650 | 6,258E-01 | 3150 | 9,840E-05 | 4650 | 7,362E-05 |
| 400 | 9,590E-01 | 700 | 1,230E-01 | 1000 | 4,527E-03 | 1700 | 6,800E-01 | 3200 | 3,000E-05 | 4700 | 1,197E-04 |
| 410 | 9,638E-01 | 710 | 8,900E-02 | 1010 | 5,091E-03 | 1750 | 7,181E-01 | 3250 | 1,033E-05 | 4750 | 1,618E-04 |
| 420 | 9,671E-01 | 720 | 6,400E-02 | 1020 | 5,708E-03 | 1800 | 7,500E-01 | 3300 | < 1,000E-05 | 4800 | 2,000E-04 |
| 430 | 9,698E-01 | 730 | 4,570E-02 | 1030 | 6,370E-03 | 1850 | 7,737E-01 | 3350 | < 1,000E-05 | 4850 | 2,286E-04 |
| 440 | 9,723E-01 | 740 | 3,200E-02 | 1040 | 7,145E-03 | 1900 | 7,945E-01 | 3400 | < 1,000E-05 | 4900 | 2,286E-04 |
| 450 | 9,748E-01 | 750 | 2,267E-02 | 1050 | 8,180E-03 | 1950 | 8,048E-01 | 3450 | < 1,000E-05 | 4950 | 2,600E-04 |
| 460 | 9,771E-01 | 760 | 1,580E-02 | 1060 | 9,350E-03 | 2000 | 8,124E-01 | 3500 | < 1,000E-05 | 5000 | 3,126E-04 |
| 470 | 9,792E-01 | 770 | 1,138E-02 | 1070 | 1,068E-02 | 2050 | 8,124E-01 | 3550 | < 1,000E-05 | 5050 | 3,802E-04 |
| 480 | 9,809E-01 | 780 | 8,250E-03 | 1080 | 1,221E-02 | 2100 | 8,100E-01 | 3600 | < 1,000E-05 | 5100 | 3,981E-04 |
| 490 | 9,819E-01 | 790 | 5,710E-03 | 1090 | 1,384E-02 | 2150 | 8,076E-01 | 3650 | < 1,000E-05 | 5150 | 3,758E-04 |

# Data Sheet

## BG42

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

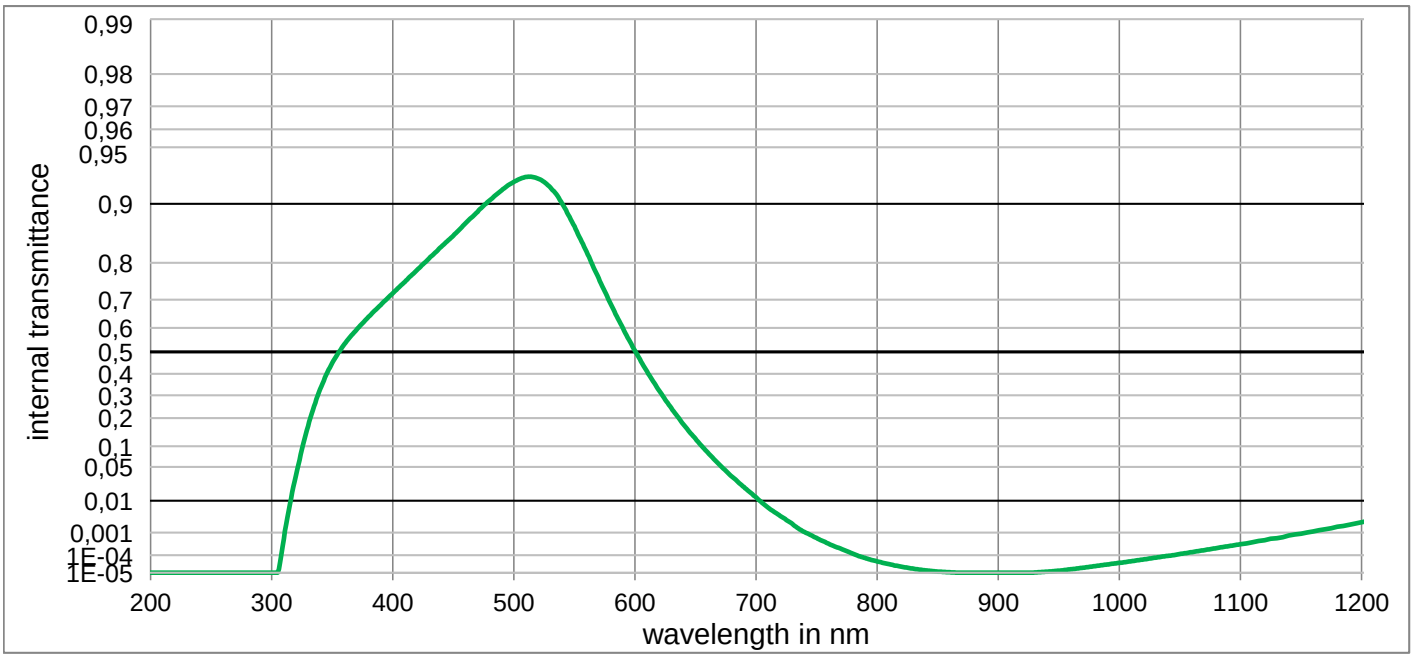
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 1,00 mm |
| **Density** | | |
| ρ | = | 2,69 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | = | 467 |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 0 |
| SR class | = | 2 |
| AR class | = | 2 |
| **Resistance against humidity** | | |
| Sensitive glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

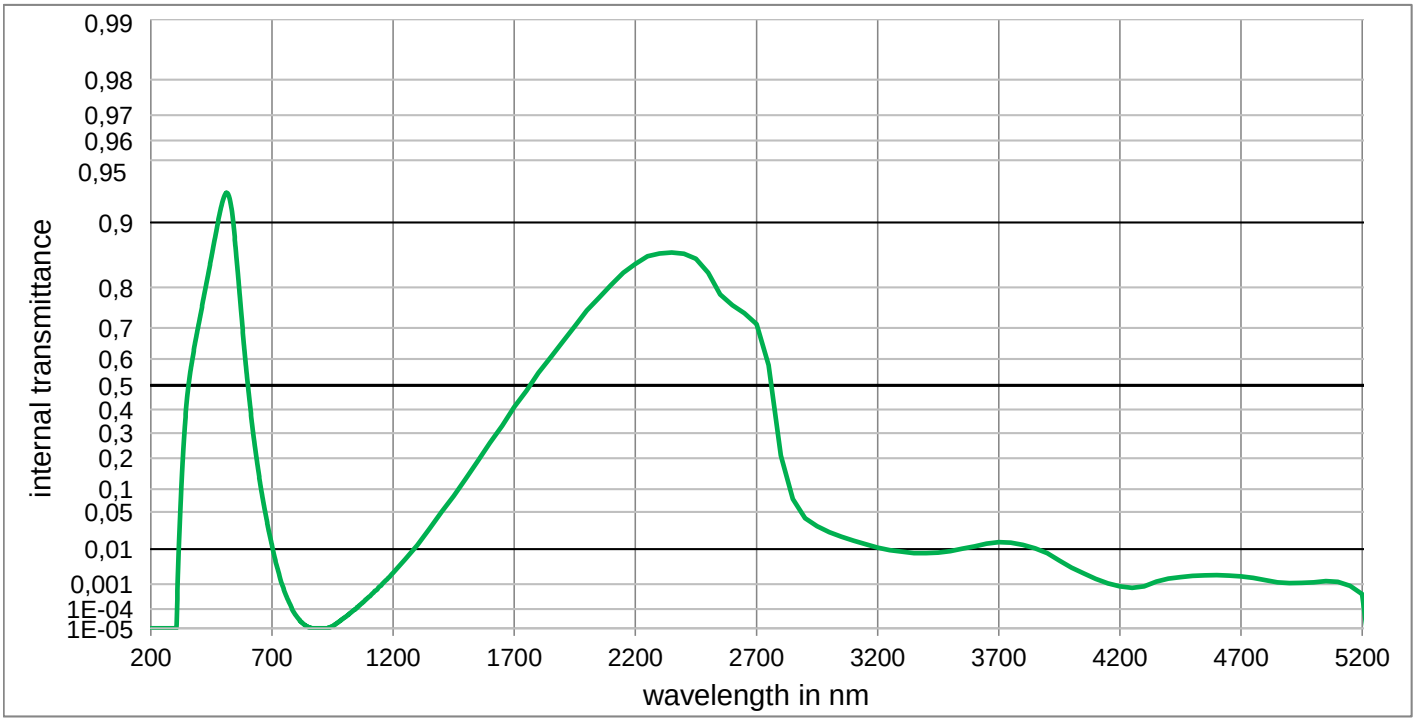
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,254 | 0,222 | 0,203 |
| | y | 0,332 | 0,334 | 0,337 |
| | Y | 68,1 | 55,2 | 46,4 |
| | $\lambda_d$ | 492 nm | 492 nm | 492 nm |
| | $P_e$ | 0,214 | 0,325 | 0,393 |
| Illuminant A | x | 0,359 |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

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## BG42




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,234E-01 | 800 | 4,721E-05 | 1100 | 3,325E-04 | 2200 | 8,435E-01 | 3700 | 1,435E-02 |
| 210 | < 1,0E-05 | 510 | 9,278E-01 | 810 | 3,258E-05 | 1110 | 4,084E-04 | 2250 | 8,557E-01 | 3750 | 1,396E-02 |
| 220 | < 1,0E-05 | 520 | 9,265E-01 | 820 | 2,344E-05 | 1120 | 4,973E-04 | 2300 | 8,600E-01 | 3800 | 1,239E-02 |
| 230 | < 1,0E-05 | 530 | 9,180E-01 | 830 | 1,770E-05 | 1130 | 6,020E-04 | 2350 | 8,614E-01 | 3850 | 1,035E-02 |
| 240 | < 1,0E-05 | 540 | 9,000E-01 | 840 | 1,400E-05 | 1140 | 7,651E-04 | 2400 | 8,595E-01 | 3900 | 8,000E-03 |
| 250 | < 1,0E-05 | 550 | 8,690E-01 | 850 | 1,183E-05 | 1150 | 8,992E-04 | 2450 | 8,519E-01 | 3950 | 5,212E-03 |
| 260 | < 1,0E-05 | 560 | 8,240E-01 | 860 | 1,066E-05 | 1160 | 1,112E-03 | 2500 | 8,284E-01 | 4000 | 3,319E-03 |
| 270 | < 1,0E-05 | 570 | 7,620E-01 | 870 | < 1,000E-05 | 1170 | 1,339E-03 | 2550 | 7,850E-01 | 4050 | 2,234E-03 |
| 280 | < 1,0E-05 | 580 | 6,860E-01 | 880 | < 1,000E-05 | 1180 | 1,636E-03 | 2600 | 7,600E-01 | 4100 | 1,507E-03 |
| 290 | < 1,0E-05 | 590 | 5,990E-01 | 890 | < 1,000E-05 | 1190 | 1,926E-03 | 2650 | 7,400E-01 | 4150 | 1,064E-03 |
| 300 | < 1,0E-05 | 600 | 5,050E-01 | 900 | < 1,000E-05 | 1200 | 2,342E-03 | 2700 | 7,106E-01 | 4200 | 8,356E-04 |
| 310 | 5,7E-04 | 610 | 4,100E-01 | 910 | < 1,000E-05 | 1250 | 5,700E-03 | 2750 | 5,777E-01 | 4250 | 7,413E-04 |
| 320 | 3,500E-02 | 620 | 3,210E-01 | 920 | < 1,000E-05 | 1300 | 1,230E-02 | 2800 | 2,100E-01 | 4300 | 8,414E-04 |
| 330 | 1,680E-01 | 630 | 2,420E-01 | 930 | 1,035E-05 | 1350 | 2,640E-02 | 2850 | 7,586E-02 | 4350 | 1,230E-03 |
| 340 | 3,280E-01 | 640 | 1,750E-01 | 940 | 1,164E-05 | 1400 | 5,000E-02 | 2900 | 4,000E-02 | 4400 | 1,549E-03 |
| 350 | 4,510E-01 | 650 | 1,230E-01 | 950 | 1,341E-05 | 1450 | 8,290E-02 | 2950 | 2,931E-02 | 4450 | 1,718E-03 |
| 360 | 5,330E-01 | 660 | 8,300E-02 | 960 | 1,644E-05 | 1500 | 1,300E-01 | 3000 | 2,280E-02 | 4500 | 1,879E-03 |
| 370 | 5,930E-01 | 670 | 5,370E-02 | 970 | 2,037E-05 | 1550 | 1,904E-01 | 3050 | 1,854E-02 | 4550 | 1,959E-03 |
| 380 | 6,420E-01 | 680 | 3,400E-02 | 980 | 2,541E-05 | 1600 | 2,600E-01 | 3100 | 1,538E-02 | 4600 | 2,000E-03 |
| 390 | 6,830E-01 | 690 | 2,079E-02 | 990 | 3,155E-05 | 1650 | 3,308E-01 | 3150 | 1,291E-02 | 4650 | 1,932E-03 |
| 400 | 7,200E-01 | 700 | 1,216E-02 | 1000 | 3,890E-05 | 1700 | 4,100E-01 | 3200 | 1,086E-02 | 4700 | 1,828E-03 |
| 410 | 7,530E-01 | 710 | 6,530E-03 | 1010 | 4,820E-05 | 1750 | 4,778E-01 | 3250 | 9,462E-03 | 4750 | 1,637E-03 |
| 420 | 7,830E-01 | 720 | 3,740E-03 | 1020 | 5,998E-05 | 1800 | 5,485E-01 | 3300 | 8,710E-03 | 4800 | 1,377E-03 |
| 430 | 8,100E-01 | 730 | 2,027E-03 | 1030 | 7,447E-05 | 1850 | 6,060E-01 | 3350 | 8,072E-03 | 4850 | 1,156E-03 |
| 440 | 8,337E-01 | 740 | 1,047E-03 | 1040 | 9,247E-05 | 1900 | 6,578E-01 | 3400 | 8,000E-03 | 4900 | 1,079E-03 |
| 450 | 8,540E-01 | 750 | 6,120E-04 | 1050 | 1,153E-04 | 1950 | 7,049E-01 | 3450 | 8,299E-03 | 4950 | 1,102E-03 |
| 460 | 8,736E-01 | 760 | 3,490E-04 | 1060 | 1,422E-04 | 2000 | 7,473E-01 | 3500 | 9,000E-03 | 5000 | 1,164E-03 |
| 470 | 8,900E-01 | 770 | 2,050E-04 | 1070 | 1,770E-04 | 2050 | 7,775E-01 | 3550 | 1,021E-02 | 5050 | 1,274E-03 |
| 480 | 9,041E-01 | 780 | 1,191E-04 | 1080 | 2,193E-04 | 2100 | 8,048E-01 | 3600 | 1,156E-02 | 5100 | 1,197E-03 |
| 490 | 9,153E-01 | 790 | 7,178E-05 | 1090 | 2,716E-04 | 2150 | 8,284E-01 | 3650 | 1,318E-02 | 5150 | 8,650E-04 |

# Data Sheet

## BG55

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,914 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,76 |
| $\tau_i$ (514 nm) | | ≥ | 0,93 |
| $\tau_i$ (633 nm) | | ≥ | 0,18 |
| $\tau_i$ (694 nm) | | ≤ | 0,016 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0005 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | 1,3373 | | |
| $B_2$ | 0,0002 | | |
| $B_3$ | 0,8117 | | |
| $C_1$ | 9,095E-03 | µm² | |
| $C_2$ | 1,4952E-02 | µm² | |
| $C_3$ | 100,000 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

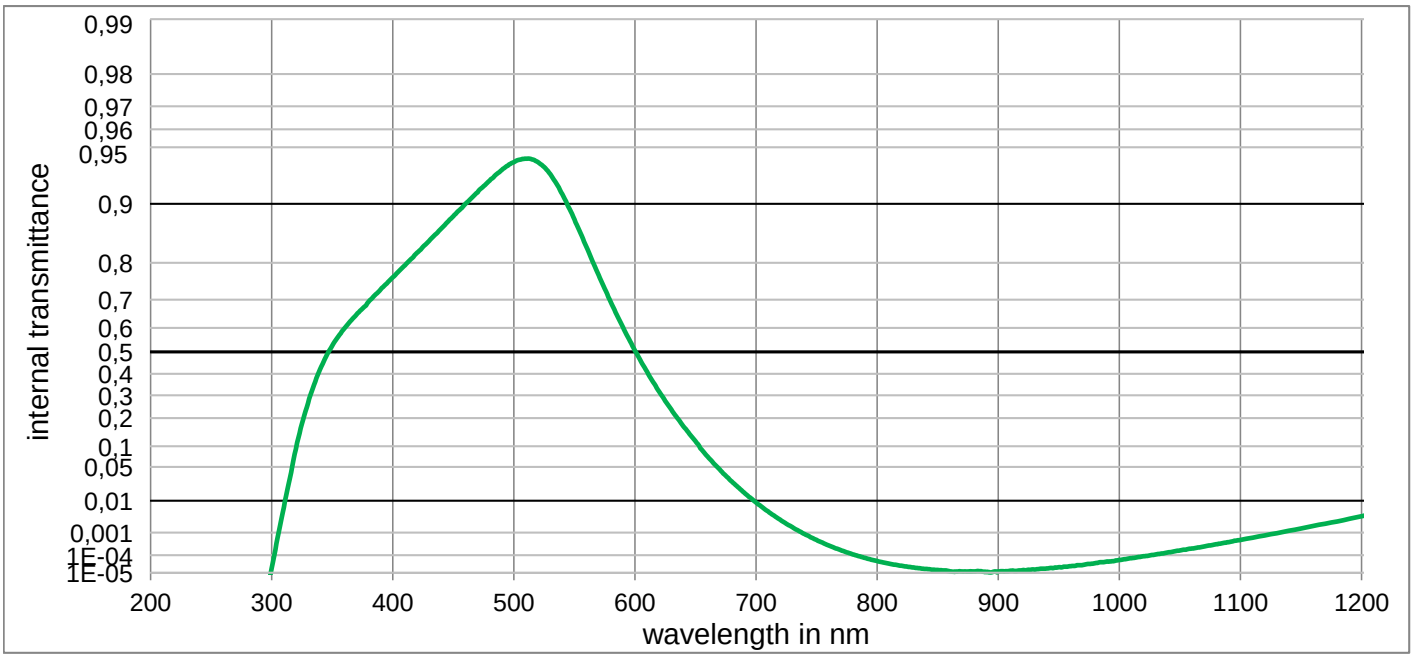
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 453 °C |
| **Thermal expansion in** | | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | | = | 7,2 |
| $\alpha_{(20°C/300°C)}$ | | = | 9,1 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 2 |
| | AR class | = | 2 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

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

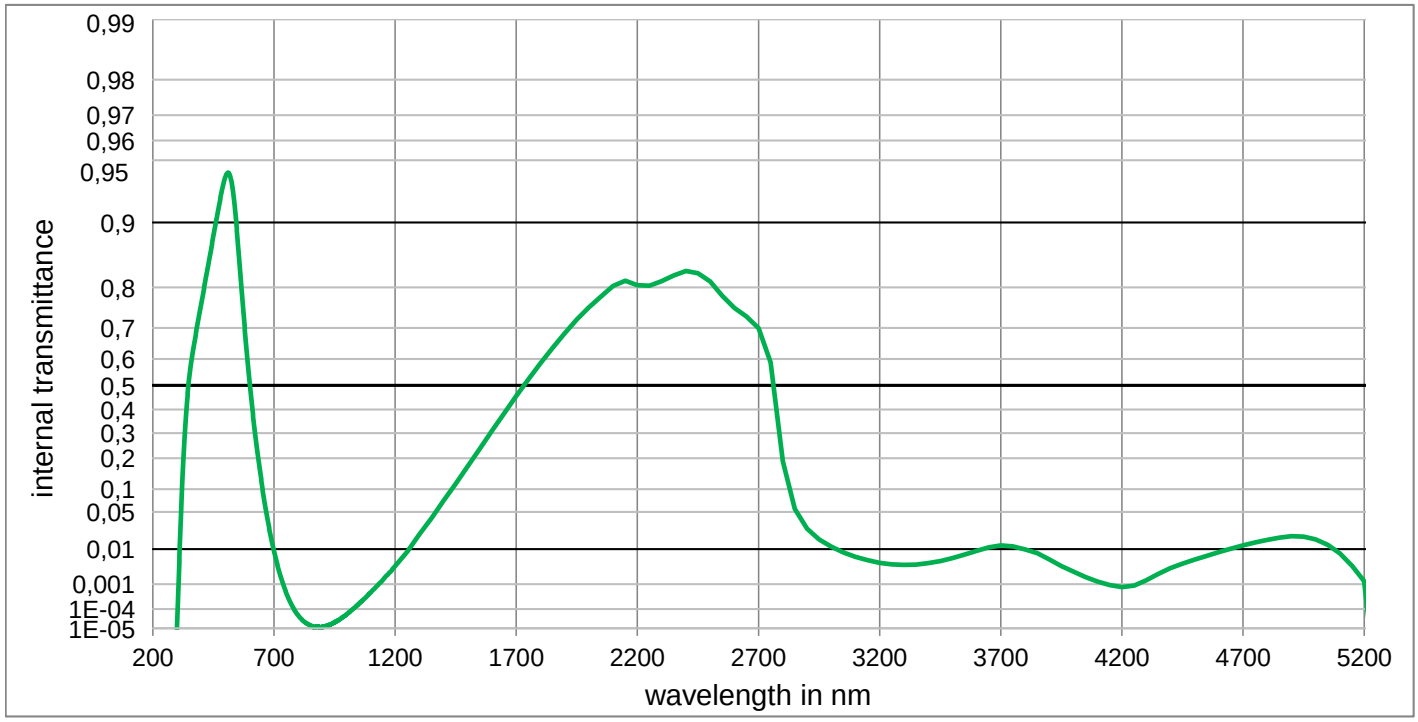
| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG55




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,399E-01 | 800 | 4,932E-05 | 1100 | 5,070E-04 | 2200 | 8,044E-01 | 3700 | 1,209E-02 |
| 210 | < 1,0E-05 | 510 | 9,424E-01 | 810 | 3,514E-05 | 1110 | 6,338E-04 | 2250 | 8,032E-01 | 3750 | 1,149E-02 |
| 220 | < 1,0E-05 | 520 | 9,400E-01 | 820 | 2,670E-05 | 1120 | 7,650E-04 | 2300 | 8,123E-01 | 3800 | 9,901E-03 |
| 230 | < 1,0E-05 | 530 | 9,303E-01 | 830 | 2,088E-05 | 1130 | 9,376E-04 | 2350 | 8,232E-01 | 3850 | 8,076E-03 |
| 240 | < 1,0E-05 | 540 | 9,110E-01 | 840 | 1,720E-05 | 1140 | 1,165E-03 | 2400 | 8,313E-01 | 3900 | 5,598E-03 |
| 250 | < 1,0E-05 | 550 | 8,792E-01 | 850 | 1,489E-05 | 1150 | 1,429E-03 | 2450 | 8,272E-01 | 3950 | 3,651E-03 |
| 260 | < 1,0E-05 | 560 | 8,329E-01 | 860 | 1,194E-05 | 1160 | 1,739E-03 | 2500 | 8,119E-01 | 4000 | 2,558E-03 |
| 270 | < 1,0E-05 | 570 | 7,701E-01 | 870 | 1,204E-05 | 1170 | 2,078E-03 | 2550 | 7,821E-01 | 4050 | 1,710E-03 |
| 280 | < 1,0E-05 | 580 | 6,928E-01 | 880 | 1,213E-05 | 1180 | 2,505E-03 | 2600 | 7,532E-01 | 4100 | 1,227E-03 |
| 290 | < 1,0E-05 | 590 | 6,029E-01 | 890 | 1,174E-05 | 1190 | 3,047E-03 | 2650 | 7,316E-01 | 4150 | 9,269E-04 |
| 300 | 1,9E-05 | 600 | 5,057E-01 | 900 | 1,213E-05 | 1200 | 3,660E-03 | 2700 | 6,993E-01 | 4200 | 7,882E-04 |
| 310 | 6,7E-03 | 610 | 4,085E-01 | 910 | 1,337E-05 | 1250 | 8,670E-03 | 2750 | 5,881E-01 | 4250 | 8,827E-04 |
| 320 | 9,213E-02 | 620 | 3,166E-01 | 920 | 1,442E-05 | 1300 | 2,062E-02 | 2800 | 1,888E-01 | 4300 | 1,344E-03 |
| 330 | 2,650E-01 | 630 | 2,354E-01 | 930 | 1,549E-05 | 1350 | 4,003E-02 | 2850 | 5,554E-02 | 4350 | 2,158E-03 |
| 340 | 4,212E-01 | 640 | 1,677E-01 | 940 | 1,815E-05 | 1400 | 7,197E-02 | 2900 | 2,645E-02 | 4400 | 3,245E-03 |
| 350 | 5,277E-01 | 650 | 1,149E-01 | 950 | 2,216E-05 | 1450 | 1,148E-01 | 2950 | 1,629E-02 | 4450 | 4,293E-03 |
| 360 | 5,980E-01 | 660 | 7,208E-02 | 960 | 2,501E-05 | 1500 | 1,710E-01 | 3000 | 1,137E-02 | 4500 | 5,522E-03 |
| 370 | 6,500E-01 | 670 | 4,508E-02 | 970 | 2,982E-05 | 1550 | 2,371E-01 | 3050 | 8,398E-03 | 4550 | 6,840E-03 |
| 380 | 6,932E-01 | 680 | 2,711E-02 | 980 | 3,763E-05 | 1600 | 3,093E-01 | 3100 | 6,519E-03 | 4600 | 8,465E-03 |
| 390 | 7,313E-01 | 690 | 1,583E-02 | 990 | 4,603E-05 | 1650 | 3,844E-01 | 3150 | 5,315E-03 | 4650 | 1,031E-02 |
| 400 | 7,648E-01 | 700 | 9,032E-03 | 1000 | 5,649E-05 | 1700 | 4,561E-01 | 3200 | 4,538E-03 | 4700 | 1,220E-02 |
| 410 | 7,945E-01 | 710 | 5,056E-03 | 1010 | 6,997E-05 | 1750 | 5,236E-01 | 3250 | 4,113E-03 | 4750 | 1,406E-02 |
| 420 | 8,214E-01 | 720 | 2,809E-03 | 1020 | 8,815E-05 | 1800 | 5,841E-01 | 3300 | 3,971E-03 | 4800 | 1,587E-02 |
| 430 | 8,447E-01 | 730 | 1,576E-03 | 1030 | 1,083E-04 | 1850 | 6,379E-01 | 3350 | 4,064E-03 | 4850 | 1,775E-02 |
| 440 | 8,657E-01 | 740 | 8,774E-04 | 1040 | 1,382E-04 | 1900 | 6,841E-01 | 3400 | 4,457E-03 | 4900 | 1,892E-02 |
| 450 | 8,842E-01 | 750 | 5,024E-04 | 1050 | 1,697E-04 | 1950 | 7,241E-01 | 3450 | 5,018E-03 | 4950 | 1,854E-02 |
| 460 | 8,999E-01 | 760 | 2,940E-04 | 1060 | 2,108E-04 | 2000 | 7,545E-01 | 3500 | 6,034E-03 | 5000 | 1,629E-02 |
| 470 | 9,131E-01 | 770 | 1,762E-04 | 1070 | 2,661E-04 | 2050 | 7,807E-01 | 3550 | 7,359E-03 | 5050 | 1,249E-02 |
| 480 | 9,246E-01 | 780 | 1,098E-04 | 1080 | 3,291E-04 | 2100 | 8,029E-01 | 3600 | 9,128E-03 | 5100 | 7,925E-03 |
| 490 | 9,338E-01 | 790 | 7,172E-05 | 1090 | 4,099E-04 | 2150 | 8,131E-01 | 3650 | 1,095E-02 | 5150 | 3,751E-03 |

# Data Sheet

## BG57

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,911 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,35 |
| $\tau_i$ (430 nm) | | ≥ | 0,37 |
| $\tau_i$ (514 nm) | | ≥ | 0,71 |
| $\tau_i$ (565 nm) | | ≥ | 0,42 |
| $\tau_i$ (633 nm) | | ≤ | 0,02 |
| $\tau_i$ (1500 nm) | | ≤ | 0,02 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,56 |
| $n_e$ (546 nm) | | = | 1,55 |
| $n_d$ (587,6 nm) | | = | 1,55 |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | | 1,2553 |
| $B_2$ | | | 0,1147 |
| $B_3$ | | | 30,4267 |
| $C_1$ | | | 4,447E-03 µm² |
| $C_2$ | | | 5,4025E-02 µm² |
| $C_3$ | | | 4843,287 µm² |
| **Internal quality** | | | |
| Bubble class | | | 0 |

| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 2,81 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 418 |

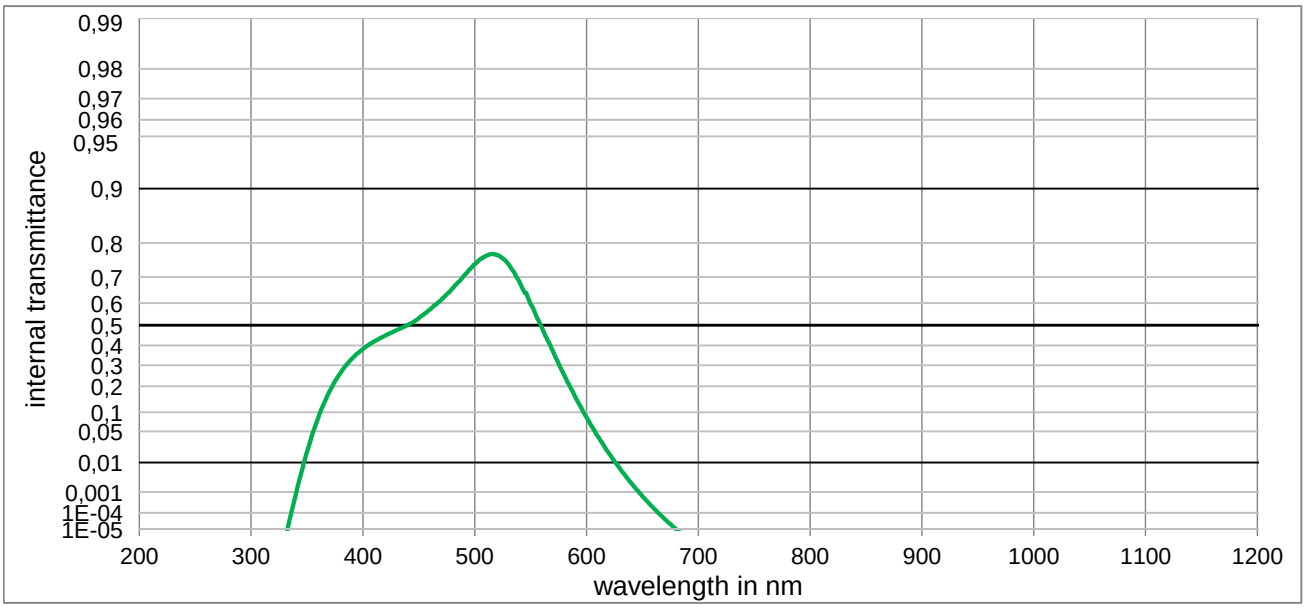
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 411 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 9,7 |
| $\alpha_{(20°C/300°C)}$ | | = | 11,5 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | | |
| | SR class | = | 5.2 |
| | AR class | = | 3 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,204 | 0,178 | 0,164 |
| | y | 0,379 | 0,442 | 0,507 |
| | Y | 40,3 | 23,8 | 15,1 |
| | $\lambda_d$ | 497 nm | 502 nm | 507 nm |
| | $P_e$ | 0,367 | 0,438 | 0,484 |
| Illuminant A | x | 0,265 | 0,215 | 0,191 |
| | y | 0,501 | 0,557 | 0,604 |
| | Y | 32,5 | 18,1 | 11,2 |
| | $\lambda_d$ | 504 nm | 507 nm | 510 nm |
| | $P_e$ | 0,412 | 0,526 | 0,589 |

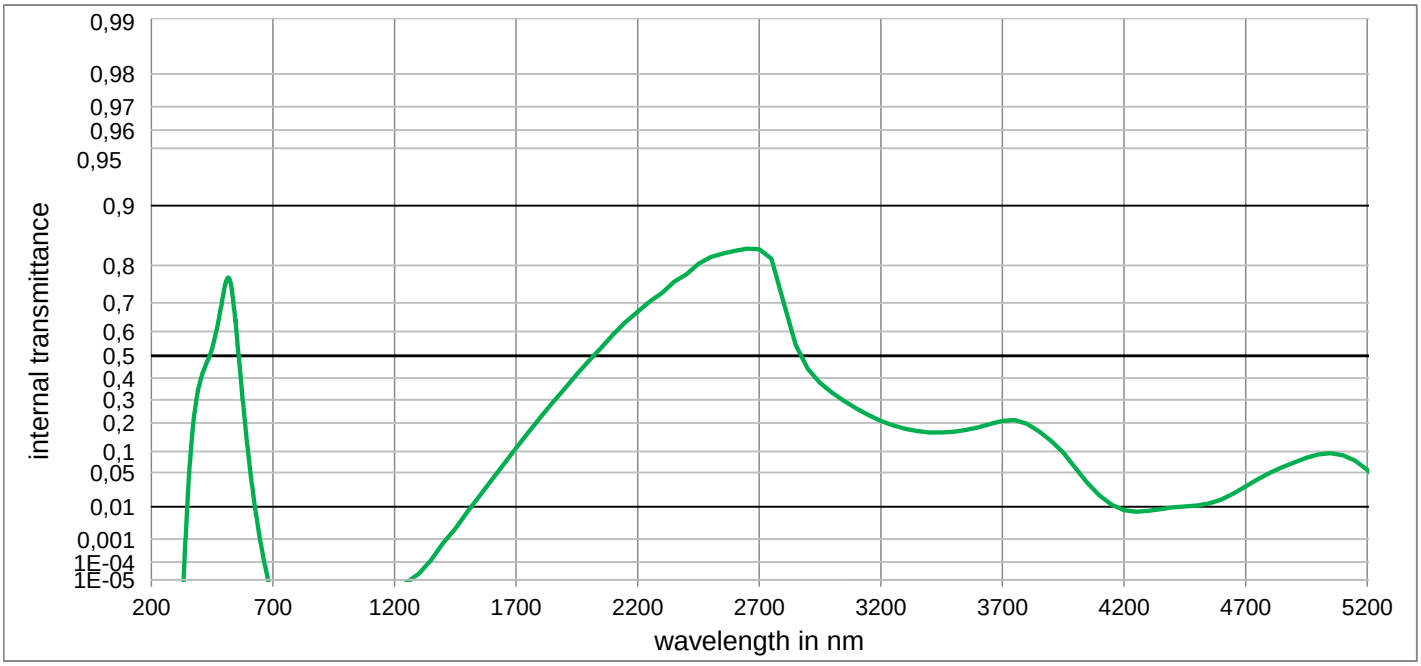
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.11mm) @ 634 nm |
| DIN 58131 |

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



# Data Sheet

## BG57




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 7,418E-01 | 800 | < 1,000E-05 | 1100 | < 1,000E-05 | 2200 | 6,716E-01 | 3700 | 2,086E-01 |
| 210 | < 1,0E-05 | 510 | 7,664E-01 | 810 | < 1,000E-05 | 1110 | < 1,000E-05 | 2250 | 7,048E-01 | 3750 | 2,119E-01 |
| 220 | < 1,0E-05 | 520 | 7,681E-01 | 820 | < 1,000E-05 | 1120 | < 1,000E-05 | 2300 | 7,297E-01 | 3800 | 1,974E-01 |
| 230 | < 1,0E-05 | 530 | 7,422E-01 | 830 | < 1,000E-05 | 1130 | < 1,000E-05 | 2350 | 7,607E-01 | 3850 | 1,676E-01 |
| 240 | < 1,0E-05 | 540 | 6,818E-01 | 840 | < 1,000E-05 | 1140 | < 1,000E-05 | 2400 | 7,794E-01 | 3900 | 1,334E-01 |
| 250 | < 1,0E-05 | 550 | 5,961E-01 | 850 | < 1,000E-05 | 1150 | < 1,000E-05 | 2450 | 8,040E-01 | 3950 | 9,679E-02 |
| 260 | < 1,0E-05 | 560 | 4,882E-01 | 860 | < 1,000E-05 | 1160 | < 1,000E-05 | 2500 | 8,182E-01 | 4000 | 5,882E-02 |
| 270 | < 1,0E-05 | 570 | 3,713E-01 | 870 | < 1,000E-05 | 1170 | < 1,000E-05 | 2550 | 8,252E-01 | 4050 | 3,246E-02 |
| 280 | < 1,0E-05 | 580 | 2,518E-01 | 880 | < 1,000E-05 | 1180 | < 1,000E-05 | 2600 | 8,305E-01 | 4100 | 1,817E-02 |
| 290 | < 1,0E-05 | 590 | 1,548E-01 | 890 | < 1,000E-05 | 1190 | < 1,000E-05 | 2650 | 8,347E-01 | 4150 | 1,116E-02 |
| 300 | < 1,0E-05 | 600 | 8,451E-02 | 900 | < 1,000E-05 | 1200 | < 1,000E-05 | 2700 | 8,336E-01 | 4200 | 8,205E-03 |
| 310 | < 1,0E-05 | 610 | 4,081E-02 | 910 | < 1,000E-05 | 1250 | < 1,000E-05 | 2750 | 8,148E-01 | 4250 | 7,387E-03 |
| 320 | < 1,000E-05 | 620 | 1,742E-02 | 920 | < 1,000E-05 | 1300 | 2,304E-05 | 2800 | 7,009E-01 | 4300 | 7,857E-03 |
| 330 | < 1,000E-05 | 630 | 6,629E-03 | 930 | < 1,000E-05 | 1350 | 1,251E-04 | 2850 | 5,444E-01 | 4350 | 8,705E-03 |
| 340 | 8,188E-04 | 640 | 2,201E-03 | 940 | < 1,000E-05 | 1400 | 7,079E-04 | 2900 | 4,421E-01 | 4400 | 9,686E-03 |
| 350 | 1,875E-02 | 650 | 6,566E-04 | 950 | < 1,000E-05 | 1450 | 2,365E-03 | 2950 | 3,779E-01 | 4450 | 1,017E-02 |
| 360 | 8,383E-02 | 660 | 1,773E-04 | 960 | < 1,000E-05 | 1500 | 7,418E-03 | 3000 | 3,318E-01 | 4500 | 1,070E-02 |
| 370 | 1,768E-01 | 670 | 4,364E-05 | 970 | < 1,000E-05 | 1550 | 1,797E-02 | 3050 | 2,938E-01 | 4550 | 1,203E-02 |
| 380 | 2,633E-01 | 680 | < 1,000E-05 | 980 | < 1,000E-05 | 1600 | 3,777E-02 | 3100 | 2,608E-01 | 4600 | 1,488E-02 |
| 390 | 3,316E-01 | 690 | < 1,000E-05 | 990 | < 1,000E-05 | 1650 | 6,814E-02 | 3150 | 2,322E-01 | 4650 | 2,011E-02 |
| 400 | 3,820E-01 | 700 | < 1,000E-05 | 1000 | < 1,000E-05 | 1700 | 1,102E-01 | 3200 | 2,086E-01 | 4700 | 2,818E-02 |
| 410 | 4,199E-01 | 710 | < 1,000E-05 | 1010 | < 1,000E-05 | 1750 | 1,632E-01 | 3250 | 1,904E-01 | 4750 | 3,846E-02 |
| 420 | 4,497E-01 | 720 | < 1,000E-05 | 1020 | < 1,000E-05 | 1800 | 2,235E-01 | 3300 | 1,772E-01 | 4800 | 4,944E-02 |
| 430 | 4,755E-01 | 730 | < 1,000E-05 | 1030 | < 1,000E-05 | 1850 | 2,874E-01 | 3350 | 1,683E-01 | 4850 | 6,034E-02 |
| 440 | 5,009E-01 | 740 | < 1,000E-05 | 1040 | < 1,000E-05 | 1900 | 3,512E-01 | 3400 | 1,635E-01 | 4900 | 7,156E-02 |
| 450 | 5,330E-01 | 750 | < 1,000E-05 | 1050 | < 1,000E-05 | 1950 | 4,175E-01 | 3450 | 1,628E-01 | 4950 | 8,292E-02 |
| 460 | 5,729E-01 | 760 | < 1,000E-05 | 1060 | < 1,000E-05 | 2000 | 4,791E-01 | 3500 | 1,658E-01 | 5000 | 9,224E-02 |
| 470 | 6,133E-01 | 770 | < 1,000E-05 | 1070 | < 1,000E-05 | 2050 | 5,347E-01 | 3550 | 1,725E-01 | 5050 | 9,526E-02 |
| 480 | 6,586E-01 | 780 | < 1,000E-05 | 1080 | < 1,000E-05 | 2100 | 5,892E-01 | 3600 | 1,827E-01 | 5100 | 8,936E-02 |
| 490 | 7,025E-01 | 790 | < 1,000E-05 | 1090 | < 1,000E-05 | 2150 | 6,349E-01 | 3650 | 1,958E-01 | 5150 | 7,563E-02 |

# Data Sheet

## BG60

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,914 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,8 |
| $\tau_i$ (514 nm) | | ≥ | 0,91 |
| $\tau_i$ (633 nm) | | ≥ | 0,1 |
| $\tau_i$ (694 nm) | | ≤ | 0,008 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0015 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 340 nm to 1550 nm | | | |
| $B_1$ | | | 1,3298 |
| $B_2$ | | | 0,0004 |
| $B_3$ | | | 2,5598 |
| $C_1$ | | | 9,241E-03 µm² |
| $C_2$ | | | 1,0918E-01 µm² |
| $C_3$ | | | 450,591 µm² |
| **Internal quality** | | | |
| Bubble class | | | 2 |

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

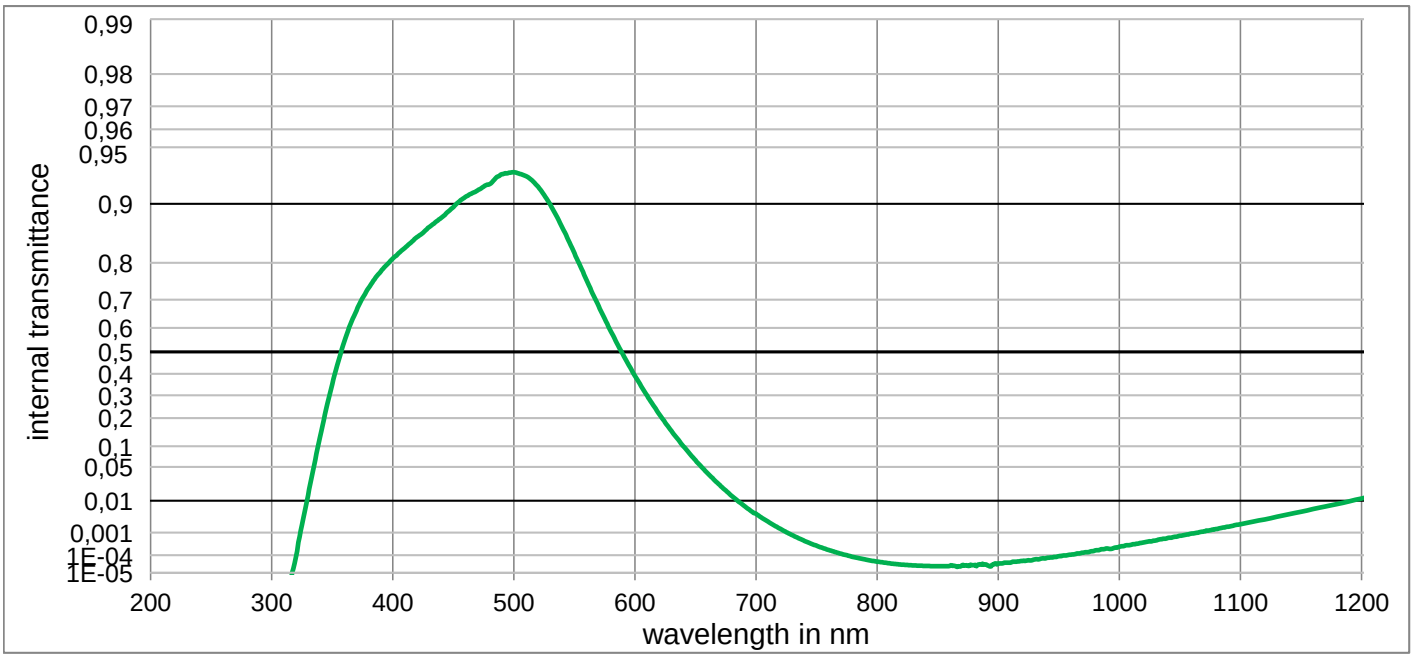
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 411 °C |
| **Thermal expansion in** | | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | | = | 12,0 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,9 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,236 | 0,201 | 0,181 |
| | y | 0,318 | 0,306 | 0,297 |
| | Y | 63,8 | 49,9 | 41,0 |
| | $\lambda_d$ | 490 nm | 489 nm | 489 nm |
| | $P_e$ | 0,286 | 0,425 | 0,506 |
| Illuminant A | x | 0,334 | 0,271 | 0,232 |
| | y | 0,436 | 0,441 | 0,437 |
| | Y | 55,7 | 40,5 | 31,7 |
| | $\lambda_d$ | 499 nm | 498 nm | 497 nm |
| | $P_e$ | 0,259 | 0,406 | 0,498 |

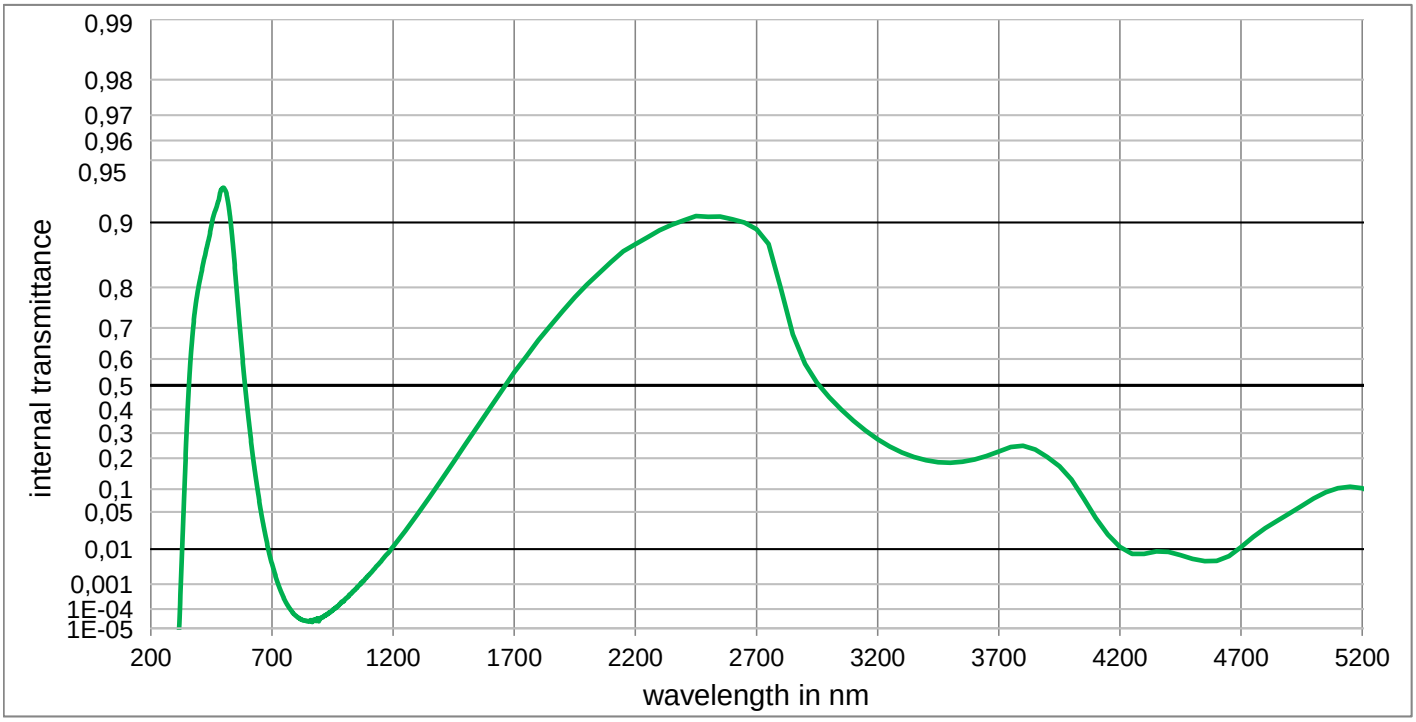
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.3mm) = 633 nm |
| DIN 58131 |

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



# Data Sheet

## BG60




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,319E-01 | 800 | 4,553E-05 | 1100 | 1,992E-03 | 2200 | 8,733E-01 | 3700 | 2,259E-01 |
| 210 | < 1,0E-05 | 510 | 9,286E-01 | 810 | 3,683E-05 | 1110 | 2,416E-03 | 2250 | 8,825E-01 | 3750 | 2,432E-01 |
| 220 | < 1,0E-05 | 520 | 9,187E-01 | 820 | 3,115E-05 | 1120 | 2,902E-03 | 2300 | 8,910E-01 | 3800 | 2,484E-01 |
| 230 | < 1,0E-05 | 530 | 8,991E-01 | 830 | 2,752E-05 | 1130 | 3,528E-03 | 2350 | 8,974E-01 | 3850 | 2,331E-01 |
| 240 | < 1,0E-05 | 540 | 8,673E-01 | 840 | 2,593E-05 | 1140 | 4,192E-03 | 2400 | 9,023E-01 | 3900 | 2,041E-01 |
| 250 | < 1,0E-05 | 550 | 8,208E-01 | 850 | 2,497E-05 | 1150 | 4,976E-03 | 2450 | 9,069E-01 | 3950 | 1,707E-01 |
| 260 | < 1,0E-05 | 560 | 7,573E-01 | 860 | 2,632E-05 | 1160 | 5,967E-03 | 2500 | 9,061E-01 | 4000 | 1,275E-01 |
| 270 | < 1,0E-05 | 570 | 6,790E-01 | 870 | 2,877E-05 | 1170 | 7,049E-03 | 2550 | 9,064E-01 | 4050 | 7,682E-02 |
| 280 | < 1,0E-05 | 580 | 5,874E-01 | 880 | 2,856E-05 | 1180 | 8,166E-03 | 2600 | 9,035E-01 | 4100 | 4,036E-02 |
| 290 | < 1,0E-05 | 590 | 4,892E-01 | 890 | 3,182E-05 | 1190 | 9,653E-03 | 2650 | 9,000E-01 | 4150 | 2,037E-02 |
| 300 | < 1,0E-05 | 600 | 3,905E-01 | 900 | 3,559E-05 | 1200 | 1,142E-02 | 2700 | 8,923E-01 | 4200 | 1,121E-02 |
| 310 | < 1,0E-05 | 610 | 2,979E-01 | 910 | 3,967E-05 | 1250 | 2,400E-02 | 2750 | 8,737E-01 | 4250 | 7,748E-03 |
| 320 | 7,831E-05 | 620 | 2,168E-01 | 920 | 4,945E-05 | 1300 | 4,588E-02 | 2800 | 7,977E-01 | 4300 | 7,701E-03 |
| 330 | 1,360E-02 | 630 | 1,505E-01 | 930 | 5,977E-05 | 1350 | 7,977E-02 | 2850 | 6,805E-01 | 4350 | 8,815E-03 |
| 340 | 1,301E-01 | 640 | 1,000E-01 | 940 | 7,197E-05 | 1400 | 1,268E-01 | 2900 | 5,825E-01 | 4400 | 8,635E-03 |
| 350 | 3,524E-01 | 650 | 6,356E-02 | 950 | 8,963E-05 | 1450 | 1,867E-01 | 2950 | 5,097E-01 | 4450 | 7,195E-03 |
| 360 | 5,453E-01 | 660 | 3,882E-02 | 960 | 1,064E-04 | 1500 | 2,557E-01 | 3000 | 4,513E-01 | 4500 | 5,756E-03 |
| 370 | 6,642E-01 | 670 | 2,294E-02 | 970 | 1,346E-04 | 1550 | 3,305E-01 | 3050 | 3,996E-01 | 4550 | 4,996E-03 |
| 380 | 7,356E-01 | 680 | 1,314E-02 | 980 | 1,709E-04 | 1600 | 4,056E-01 | 3100 | 3,524E-01 | 4600 | 5,132E-03 |
| 390 | 7,795E-01 | 690 | 7,409E-03 | 990 | 2,146E-04 | 1650 | 4,814E-01 | 3150 | 3,104E-01 | 4650 | 6,813E-03 |
| 400 | 8,093E-01 | 700 | 4,338E-03 | 1000 | 2,576E-04 | 1700 | 5,511E-01 | 3200 | 2,744E-01 | 4700 | 1,106E-02 |
| 410 | 8,314E-01 | 710 | 2,421E-03 | 1010 | 3,170E-04 | 1750 | 6,093E-01 | 3250 | 2,449E-01 | 4750 | 1,826E-02 |
| 420 | 8,515E-01 | 720 | 1,378E-03 | 1020 | 3,967E-04 | 1800 | 6,632E-01 | 3300 | 2,218E-01 | 4800 | 2,702E-02 |
| 430 | 8,678E-01 | 730 | 7,905E-04 | 1030 | 4,818E-04 | 1850 | 7,071E-01 | 3350 | 2,043E-01 | 4850 | 3,642E-02 |
| 440 | 8,817E-01 | 740 | 4,644E-04 | 1040 | 6,148E-04 | 1900 | 7,456E-01 | 3400 | 1,921E-01 | 4900 | 4,731E-02 |
| 450 | 8,959E-01 | 750 | 2,818E-04 | 1050 | 7,502E-04 | 1950 | 7,786E-01 | 3450 | 1,852E-01 | 4950 | 6,127E-02 |
| 460 | 9,080E-01 | 760 | 1,794E-04 | 1060 | 9,159E-04 | 2000 | 8,056E-01 | 3500 | 1,834E-01 | 5000 | 7,711E-02 |
| 470 | 9,150E-01 | 770 | 1,187E-04 | 1070 | 1,118E-03 | 2050 | 8,274E-01 | 3550 | 1,867E-01 | 5050 | 9,209E-02 |
| 480 | 9,214E-01 | 780 | 8,223E-05 | 1080 | 1,357E-03 | 2100 | 8,467E-01 | 3600 | 1,950E-01 | 5100 | 1,029E-01 |
| 490 | 9,303E-01 | 790 | 6,013E-05 | 1090 | 1,655E-03 | 2150 | 8,632E-01 | 3650 | 2,082E-01 | 5150 | 1,065E-01 |

# Data Sheet

## BG60HT

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,914 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,85 |
| $\tau_i$ (514 nm) | | ≥ | 0,93 |
| $\tau_i$ (633 nm) | | ≥ | 0,1 |
| $\tau_i$ (694 nm) | | ≤ | 0,008 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0015 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 340 nm to 1550 nm | | | |
| $B_1$ | 1,3298 | | |
| $B_2$ | 0,0004 | | |
| $B_3$ | 2,5598 | | |
| $C_1$ | 9,241E-03 | µm² | |
| $C_2$ | 1,0918E-01 | µm² | |
| $C_3$ | 450,591 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

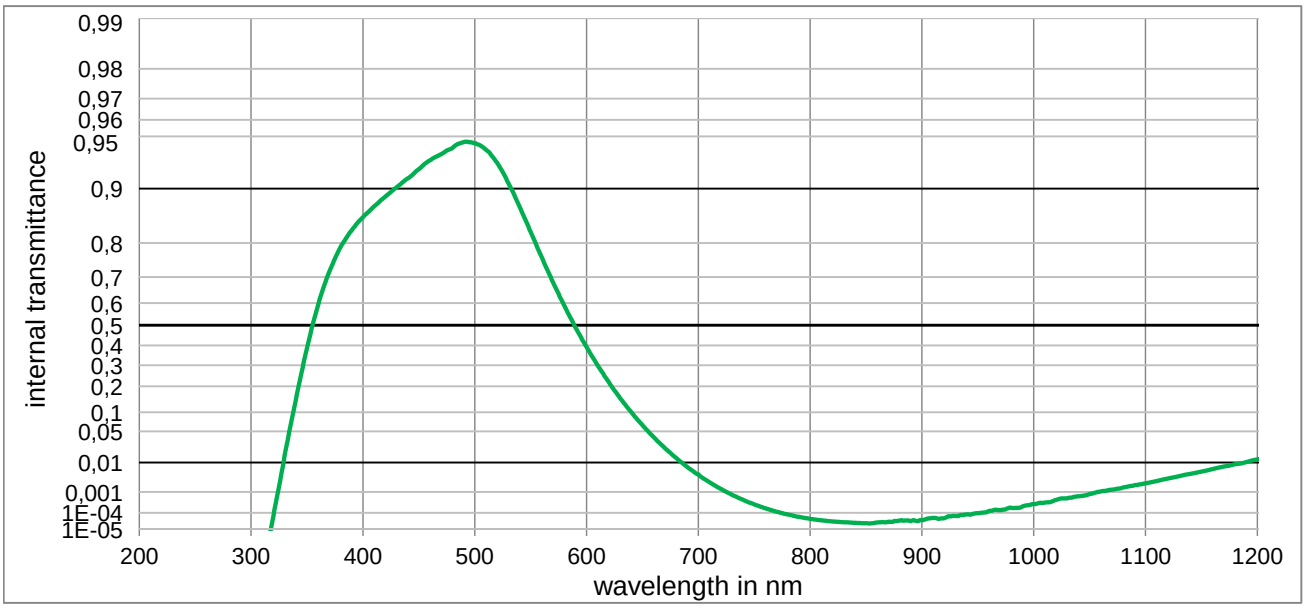
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 411 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 12,0 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,9 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.2 |
| | AR class | = | 3.2 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,233 | 0,198 | 0,178 |
| | y | 0,315 | 0,300 | 0,287 |
| | Y | 64,1 | 50,6 | 42,0 |
| | $\lambda_d$ | 489 nm | 488 nm | 488 nm |
| | $P_e$ | 0,300 | 0,442 | 0,525 |
| Illuminant A | x | 0,330 | 0,266 | 0,227 |
| | y | 0,435 | 0,436 | 0,429 |
| | Y | 55,7 | 40,8 | 32,2 |
| | $\lambda_d$ | 499 nm | 498 nm | 496 nm |
| | $P_e$ | 0,270 | 0,421 | 0,514 |

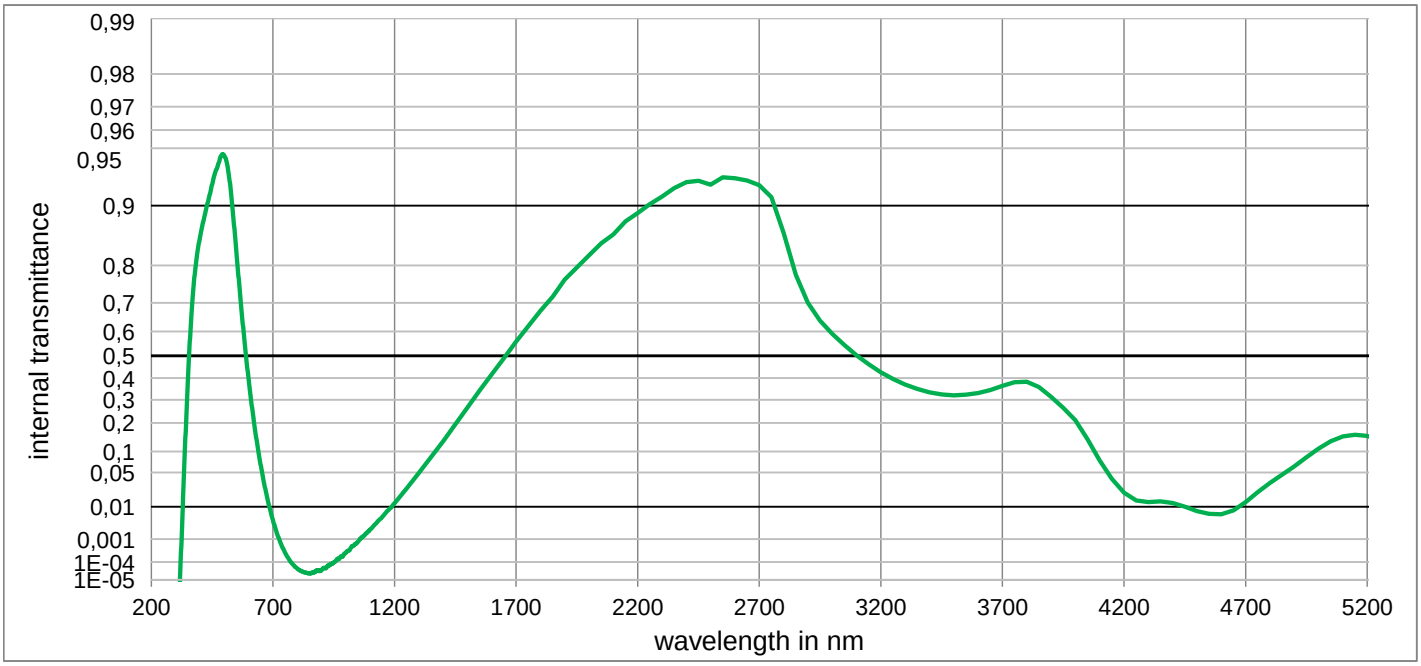
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.3mm) = 633 nm |
| DIN 58131 |

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



# Data Sheet

## BG60HT




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 9,452E-01 | 800 | 4,502E-05 | 1100 | 2,177E-03 | 2200 | 8,909E-01 | 3700 | 3,635E-01 |
| 210 | < | 1,0E-05 | 510 | 9,404E-01 | 810 | 3,656E-05 | 1110 | 2,626E-03 | 2250 | 9,019E-01 | 3750 | 3,805E-01 |
| 220 | < | 1,0E-05 | 520 | 9,288E-01 | 820 | 3,119E-05 | 1120 | 3,188E-03 | 2300 | 9,103E-01 | 3800 | 3,826E-01 |
| 230 | < | 1,0E-05 | 530 | 9,073E-01 | 830 | 2,793E-05 | 1130 | 3,874E-03 | 2350 | 9,188E-01 | 3850 | 3,583E-01 |
| 240 | < | 1,0E-05 | 540 | 8,739E-01 | 840 | 2,564E-05 | 1140 | 4,603E-03 | 2400 | 9,246E-01 | 3900 | 3,143E-01 |
| 250 | < | 1,0E-05 | 550 | 8,260E-01 | 850 | 2,372E-05 | 1150 | 5,383E-03 | 2450 | 9,257E-01 | 3950 | 2,645E-01 |
| 260 | < | 1,0E-05 | 560 | 7,618E-01 | 860 | 2,639E-05 | 1160 | 6,519E-03 | 2500 | 9,222E-01 | 4000 | 2,114E-01 |
| 270 | < | 1,0E-05 | 570 | 6,817E-01 | 870 | 2,872E-05 | 1170 | 7,711E-03 | 2550 | 9,288E-01 | 4050 | 1,384E-01 |
| 280 | < | 1,0E-05 | 580 | 5,900E-01 | 880 | 3,410E-05 | 1180 | 8,976E-03 | 2600 | 9,279E-01 | 4100 | 7,617E-02 |
| 290 | < | 1,0E-05 | 590 | 4,908E-01 | 890 | 3,233E-05 | 1190 | 1,032E-02 | 2650 | 9,261E-01 | 4150 | 3,905E-02 |
| 300 | < | 1,0E-05 | 600 | 3,920E-01 | 900 | 3,719E-05 | 1200 | 1,224E-02 | 2700 | 9,218E-01 | 4200 | 2,110E-02 |
| 310 | < | 1,0E-05 | 610 | 2,994E-01 | 910 | 5,030E-05 | 1250 | 2,586E-02 | 2750 | 9,096E-01 | 4250 | 1,416E-02 |
| 320 | | 7,415E-05 | 620 | 2,184E-01 | 920 | 4,952E-05 | 1300 | 4,890E-02 | 2800 | 8,624E-01 | 4300 | 1,306E-02 |
| 330 | | 1,574E-02 | 630 | 1,509E-01 | 930 | 6,534E-05 | 1350 | 8,439E-02 | 2850 | 7,781E-01 | 4350 | 1,346E-02 |
| 340 | | 1,447E-01 | 640 | 1,002E-01 | 940 | 8,100E-05 | 1400 | 1,324E-01 | 2900 | 7,003E-01 | 4400 | 1,236E-02 |
| 350 | | 3,866E-01 | 650 | 6,391E-02 | 950 | 9,477E-05 | 1450 | 1,953E-01 | 2950 | 6,400E-01 | 4450 | 9,979E-03 |
| 360 | | 5,939E-01 | 660 | 3,912E-02 | 960 | 1,248E-04 | 1500 | 2,655E-01 | 3000 | 5,905E-01 | 4500 | 7,775E-03 |
| 370 | | 7,185E-01 | 670 | 2,310E-02 | 970 | 1,384E-04 | 1550 | 3,426E-01 | 3050 | 5,454E-01 | 4550 | 6,476E-03 |
| 380 | | 7,901E-01 | 680 | 1,336E-02 | 980 | 1,873E-04 | 1600 | 4,175E-01 | 3100 | 5,027E-01 | 4600 | 6,340E-03 |
| 390 | | 8,295E-01 | 690 | 7,552E-03 | 990 | 2,146E-04 | 1650 | 4,899E-01 | 3150 | 4,626E-01 | 4650 | 8,118E-03 |
| 400 | | 8,554E-01 | 700 | 4,483E-03 | 1000 | 2,823E-04 | 1700 | 5,594E-01 | 3200 | 4,268E-01 | 4700 | 1,303E-02 |
| 410 | | 8,740E-01 | 710 | 2,369E-03 | 1010 | 3,353E-04 | 1750 | 6,200E-01 | 3250 | 3,957E-01 | 4750 | 2,161E-02 |
| 420 | | 8,890E-01 | 720 | 1,335E-03 | 1020 | 4,468E-04 | 1800 | 6,742E-01 | 3300 | 3,700E-01 | 4800 | 3,292E-02 |
| 430 | | 9,016E-01 | 730 | 7,666E-04 | 1030 | 5,325E-04 | 1850 | 7,188E-01 | 3350 | 3,495E-01 | 4850 | 4,615E-02 |
| 440 | | 9,125E-01 | 740 | 4,521E-04 | 1040 | 6,468E-04 | 1900 | 7,658E-01 | 3400 | 3,339E-01 | 4900 | 6,232E-02 |
| 450 | | 9,226E-01 | 750 | 2,747E-04 | 1050 | 8,132E-04 | 1950 | 7,954E-01 | 3450 | 3,245E-01 | 4950 | 8,366E-02 |
| 460 | | 9,312E-01 | 760 | 1,741E-04 | 1060 | 1,044E-03 | 2000 | 8,219E-01 | 3500 | 3,205E-01 | 5000 | 1,085E-01 |
| 470 | | 9,365E-01 | 770 | 1,155E-04 | 1070 | 1,248E-03 | 2050 | 8,448E-01 | 3550 | 3,231E-01 | 5050 | 1,318E-01 |
| 480 | | 9,417E-01 | 780 | 8,046E-05 | 1080 | 1,509E-03 | 2100 | 8,596E-01 | 3600 | 3,311E-01 | 5100 | 1,485E-01 |
| 490 | | 9,460E-01 | 790 | 5,856E-05 | 1090 | 1,833E-03 | 2150 | 8,797E-01 | 3650 | 3,451E-01 | 5150 | 1,548E-01 |

# Data Sheet

## BG61

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,915 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,84 |
| $\tau_i$ (514 nm) | | ≥ | 0,93 |
| $\tau_i$ (633 nm) | | ≥ | 0,18 |
| $\tau_i$ (694 nm) | | ≤ | 0,03 |
| $\tau_i$ (1060 nm) | | ≤ | 0,008 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,53 |
| **Sellmeier coefficients** | | | |
| valid from 340 nm to 1550 nm | | | |
| $B_1$ | 1,3212 | | |
| $B_2$ | 0,0004 | | |
| $B_3$ | 0,0589 | | |
| $C_1$ | 9,180E-03 | µm² | |
| $C_2$ | 1,1649E-01 | µm² | |
| $C_3$ | 12,101 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

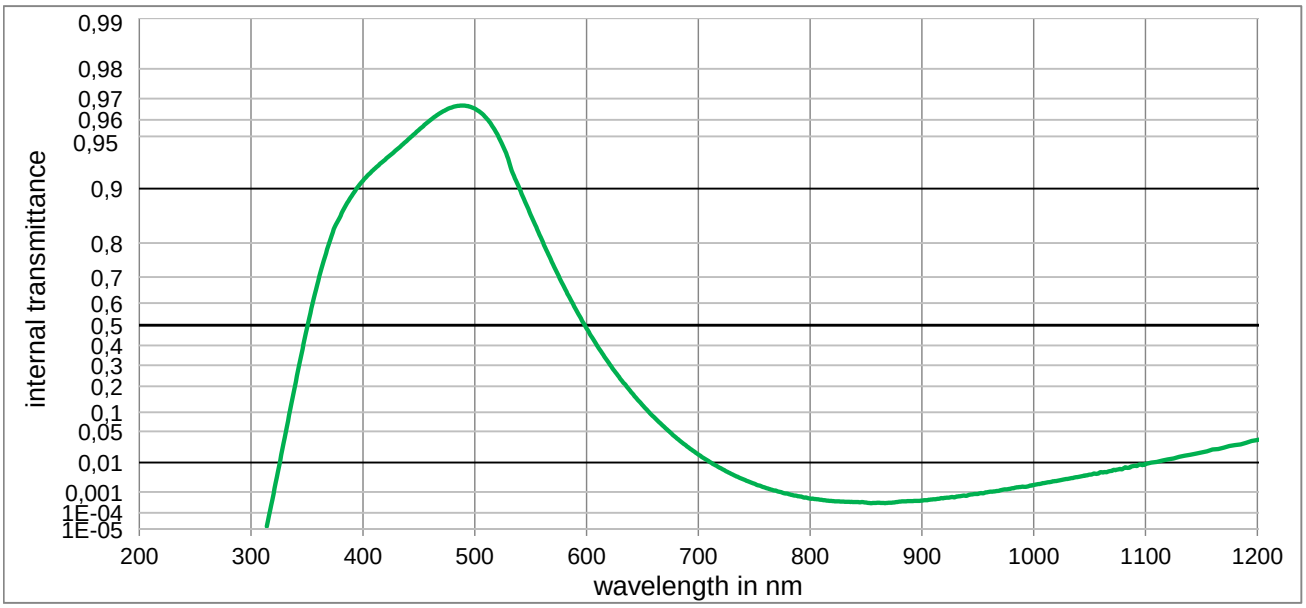
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 402 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 11,9 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,9 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,245 | 0,210 | 0,189 |
| | y | 0,319 | 0,307 | 0,296 |
| | Y | 68,0 | 55,2 | 46,7 |
| | $\lambda_d$ | 490 nm | 489 nm | 488 nm |
| | $P_e$ | 0,254 | 0,391 | 0,476 |
| Illuminant A | x | 0,349 | 0,289 | 0,250 |
| | y | 0,432 | 0,438 | 0,435 |
| | Y | 60,4 | 45,7 | 36,9 |
| | $\lambda_d$ | 499 nm | 498 nm | 497 nm |
| | $P_e$ | 0,225 | 0,365 | 0,458 |

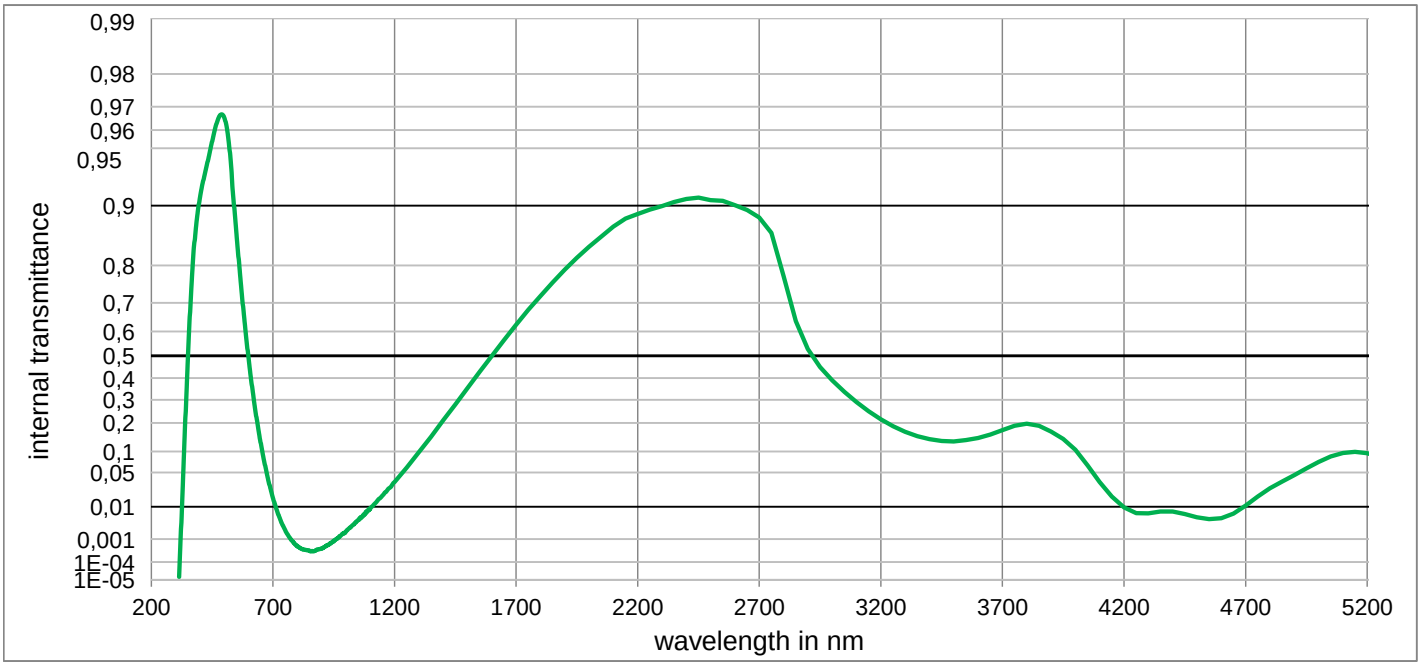
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.3mm) = 648 nm |
| DIN 58131 |

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



# Data Sheet

## BG61




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 9,656E-01 | 800 | 5,193E-04 | 1100 | 9,044E-03 | 2200 | 8,897E-01 | 3700 | 1,718E-01 |
| 210 | < | 1,0E-05 | 510 | 9,612E-01 | 810 | 4,547E-04 | 1110 | 1,045E-02 | 2250 | 8,951E-01 | 3750 | 1,889E-01 |
| 220 | < | 1,0E-05 | 520 | 9,516E-01 | 820 | 3,958E-04 | 1120 | 1,210E-02 | 2300 | 8,995E-01 | 3800 | 1,973E-01 |
| 230 | < | 1,0E-05 | 530 | 9,326E-01 | 830 | 3,721E-04 | 1130 | 1,412E-02 | 2350 | 9,042E-01 | 3850 | 1,886E-01 |
| 240 | < | 1,0E-05 | 540 | 9,001E-01 | 840 | 3,530E-04 | 1140 | 1,599E-02 | 2400 | 9,076E-01 | 3900 | 1,668E-01 |
| 250 | < | 1,0E-05 | 550 | 8,602E-01 | 850 | 3,372E-04 | 1150 | 1,819E-02 | 2450 | 9,091E-01 | 3950 | 1,399E-01 |
| 260 | < | 1,0E-05 | 560 | 8,082E-01 | 860 | 3,277E-04 | 1160 | 2,144E-02 | 2500 | 9,064E-01 | 4000 | 1,051E-01 |
| 270 | < | 1,0E-05 | 570 | 7,417E-01 | 870 | 3,291E-04 | 1170 | 2,359E-02 | 2550 | 9,055E-01 | 4050 | 6,433E-02 |
| 280 | < | 1,0E-05 | 580 | 6,631E-01 | 880 | 3,728E-04 | 1180 | 2,664E-02 | 2600 | 9,005E-01 | 4100 | 3,430E-02 |
| 290 | < | 1,0E-05 | 590 | 5,767E-01 | 890 | 3,944E-04 | 1190 | 3,013E-02 | 2650 | 8,947E-01 | 4150 | 1,749E-02 |
| 300 | < | 1,0E-05 | 600 | 4,848E-01 | 900 | 4,116E-04 | 1200 | 3,407E-02 | 2700 | 8,849E-01 | 4200 | 9,654E-03 |
| 310 | < | 1,0E-05 | 610 | 3,949E-01 | 910 | 4,741E-04 | 1250 | 5,972E-02 | 2750 | 8,623E-01 | 4250 | 6,791E-03 |
| 320 | | 8,279E-04 | 620 | 3,106E-01 | 920 | 5,553E-04 | 1300 | 9,768E-02 | 2800 | 7,744E-01 | 4300 | 6,709E-03 |
| 330 | | 3,776E-02 | 630 | 2,359E-01 | 930 | 6,122E-04 | 1350 | 1,471E-01 | 2850 | 6,386E-01 | 4350 | 7,569E-03 |
| 340 | | 2,218E-01 | 640 | 1,744E-01 | 940 | 6,917E-04 | 1400 | 2,110E-01 | 2900 | 5,289E-01 | 4400 | 7,518E-03 |
| 350 | | 4,867E-01 | 650 | 1,247E-01 | 950 | 8,146E-04 | 1450 | 2,800E-01 | 2950 | 4,504E-01 | 4450 | 6,408E-03 |
| 360 | | 6,867E-01 | 660 | 8,605E-02 | 960 | 9,997E-04 | 1500 | 3,528E-01 | 3000 | 3,893E-01 | 4500 | 5,234E-03 |
| 370 | | 8,013E-01 | 670 | 5,862E-02 | 970 | 1,164E-03 | 1550 | 4,286E-01 | 3050 | 3,366E-01 | 4550 | 4,591E-03 |
| 380 | | 8,579E-01 | 680 | 3,831E-02 | 980 | 1,375E-03 | 1600 | 4,994E-01 | 3100 | 2,896E-01 | 4600 | 4,923E-03 |
| 390 | | 8,900E-01 | 690 | 2,506E-02 | 990 | 1,621E-03 | 1650 | 5,662E-01 | 3150 | 2,488E-01 | 4650 | 6,605E-03 |
| 400 | | 9,099E-01 | 700 | 1,619E-02 | 1000 | 1,899E-03 | 1700 | 6,247E-01 | 3200 | 2,145E-01 | 4700 | 1,066E-02 |
| 410 | | 9,225E-01 | 710 | 1,049E-02 | 1010 | 2,246E-03 | 1750 | 6,771E-01 | 3250 | 1,871E-01 | 4750 | 1,748E-02 |
| 420 | | 9,320E-01 | 720 | 6,864E-03 | 1020 | 2,621E-03 | 1800 | 7,210E-01 | 3300 | 1,658E-01 | 4800 | 2,590E-02 |
| 430 | | 9,401E-01 | 730 | 4,501E-03 | 1030 | 3,084E-03 | 1850 | 7,586E-01 | 3350 | 1,500E-01 | 4850 | 3,480E-02 |
| 440 | | 9,475E-01 | 740 | 3,032E-03 | 1040 | 3,652E-03 | 1900 | 7,902E-01 | 3400 | 1,394E-01 | 4900 | 4,502E-02 |
| 450 | | 9,542E-01 | 750 | 2,113E-03 | 1050 | 4,329E-03 | 1950 | 8,168E-01 | 3450 | 1,330E-01 | 4950 | 5,802E-02 |
| 460 | | 9,597E-01 | 760 | 1,465E-03 | 1060 | 5,237E-03 | 2000 | 8,384E-01 | 3500 | 1,313E-01 | 5000 | 7,262E-02 |
| 470 | | 9,638E-01 | 770 | 1,094E-03 | 1070 | 5,656E-03 | 2050 | 8,562E-01 | 3550 | 1,359E-01 | 5050 | 8,615E-02 |
| 480 | | 9,663E-01 | 780 | 8,376E-04 | 1080 | 6,708E-03 | 2100 | 8,717E-01 | 3600 | 1,432E-01 | 5100 | 9,571E-02 |
| 490 | | 9,670E-01 | 790 | 6,491E-04 | 1090 | 8,091E-03 | 2150 | 8,834E-01 | 3650 | 1,554E-01 | 5150 | 9,889E-02 |

# Data Sheet

## BG62

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,914 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,73 |
| $\tau_i$ (514 nm) | | ≥ | 0,89 |
| $\tau_i$ (633 nm) | | ≥ | 0,08 |
| $\tau_i$ (694 nm) | | ≤ | 0,005 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0005 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 340 nm to 1550 nm | | | |
| $B_1$ | | | 1,2129 |
| $B_2$ | | | 0,1238 |
| $B_3$ | | | 0,0621 |
| $C_1$ | | | 6,667E-03 µm² |
| $C_2$ | | | 3,0034E-02 µm² |
| $C_3$ | | | 12,219 µm² |
| **Internal quality** | | | |
| Bubble class | | | 2 |

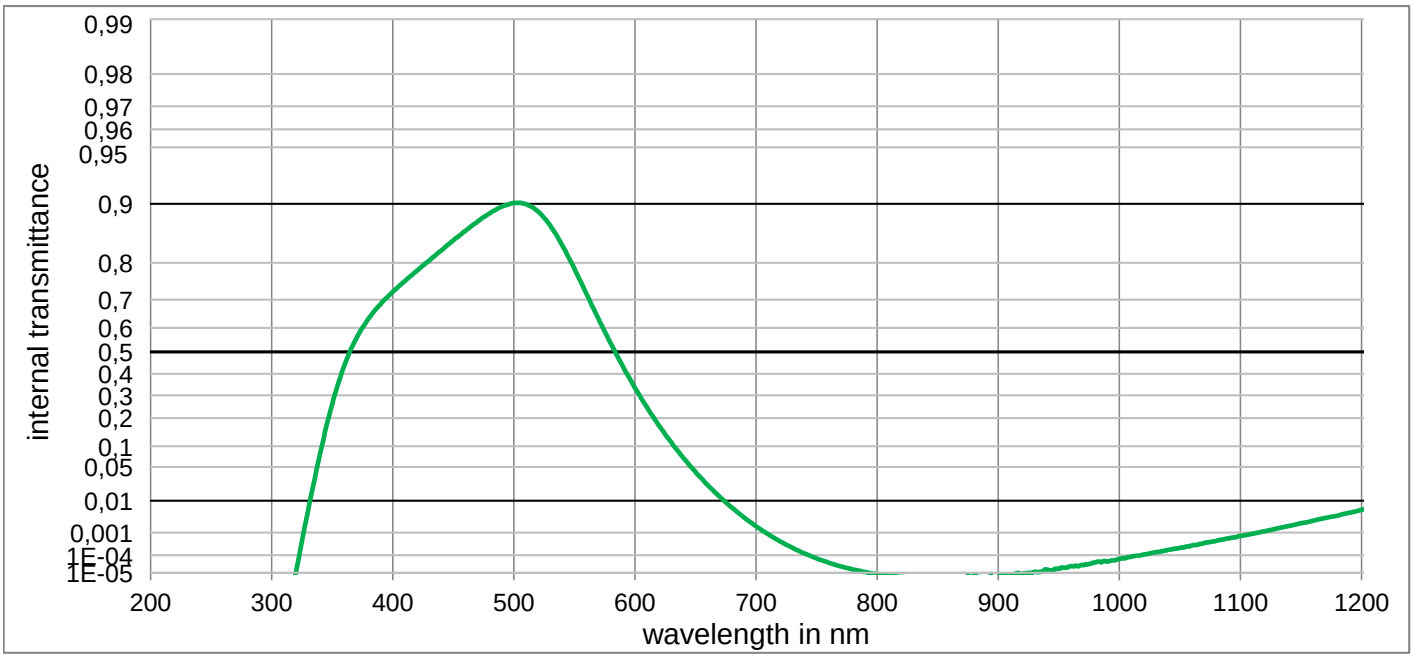
| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 2,85 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 368 |

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

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

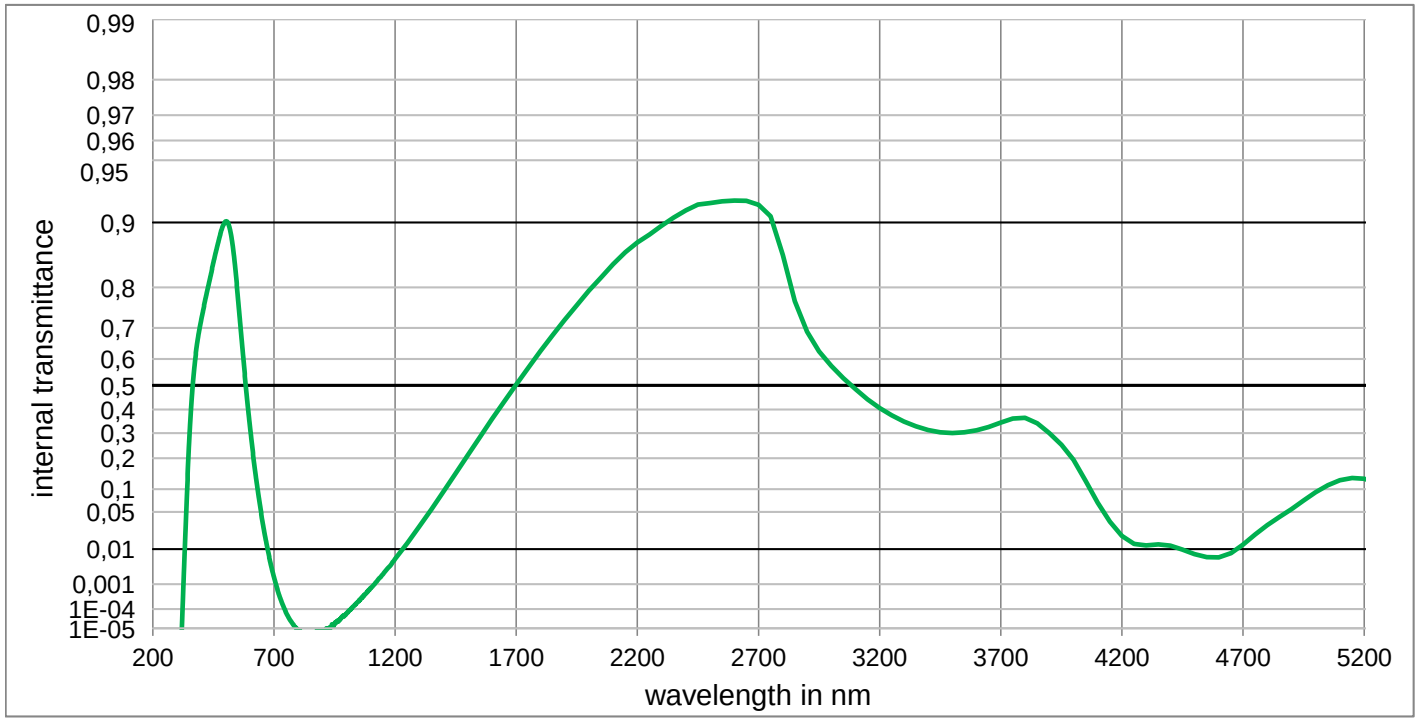
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,229 | 0,194 | 0,175 |
| | y | 0,320 | 0,311 | 0,305 |
| | Y | 60,0 | 45,1 | 35,8 |
| | $\lambda_d$ | 490 nm | 490 nm | 489 nm |
| | $P_e$ | 0,312 | 0,446 | 0,520 |
| Illuminant A | x | 0,321 | 0,257 | 0,220 |
| | y | 0,441 | 0,447 | 0,445 |
| | Y | 51,6 | 36,0 | 27,2 |
| | $\lambda_d$ | 499 nm | 498 nm | 498 nm |
| | $P_e$ | 0,290 | 0,438 | 0,524 |

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.21mm) = 644 nm |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## BG62




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,010E-01 | 800 | < 1,000E-05 | 1100 | 7,390E-04 | 2200 | 8,757E-01 | 3700 | 3,448E-01 |
| 210 | < 1,0E-05 | 510 | 8,996E-01 | 810 | < 1,000E-05 | 1110 | 9,134E-04 | 2250 | 8,858E-01 | 3750 | 3,621E-01 |
| 220 | < 1,0E-05 | 520 | 8,902E-01 | 820 | < 1,000E-05 | 1120 | 1,135E-03 | 2300 | 8,963E-01 | 3800 | 3,647E-01 |
| 230 | < 1,0E-05 | 530 | 8,704E-01 | 830 | < 1,000E-05 | 1130 | 1,415E-03 | 2350 | 9,053E-01 | 3850 | 3,416E-01 |
| 240 | < 1,0E-05 | 540 | 8,363E-01 | 840 | < 1,000E-05 | 1140 | 1,732E-03 | 2400 | 9,126E-01 | 3900 | 2,998E-01 |
| 250 | < 1,0E-05 | 550 | 7,859E-01 | 850 | < 1,000E-05 | 1150 | 2,149E-03 | 2450 | 9,180E-01 | 3950 | 2,524E-01 |
| 260 | < 1,0E-05 | 560 | 7,179E-01 | 860 | < 1,000E-05 | 1160 | 2,620E-03 | 2500 | 9,193E-01 | 4000 | 1,940E-01 |
| 270 | < 1,0E-05 | 570 | 6,330E-01 | 870 | < 1,000E-05 | 1170 | 3,235E-03 | 2550 | 9,208E-01 | 4050 | 1,235E-01 |
| 280 | < 1,0E-05 | 580 | 5,365E-01 | 880 | < 1,000E-05 | 1180 | 3,803E-03 | 2600 | 9,215E-01 | 4100 | 6,781E-02 |
| 290 | < 1,0E-05 | 590 | 4,347E-01 | 890 | < 1,000E-05 | 1190 | 4,695E-03 | 2650 | 9,213E-01 | 4150 | 3,506E-02 |
| 300 | < 1,0E-05 | 600 | 3,347E-01 | 900 | < 1,000E-05 | 1200 | 5,724E-03 | 2700 | 9,177E-01 | 4200 | 1,926E-02 |
| 310 | < 1,0E-05 | 610 | 2,446E-01 | 910 | < 1,000E-05 | 1250 | 1,361E-02 | 2750 | 9,065E-01 | 4250 | 1,309E-02 |
| 320 | 1,091E-05 | 620 | 1,691E-01 | 920 | < 1,000E-05 | 1300 | 2,886E-02 | 2800 | 8,575E-01 | 4300 | 1,218E-02 |
| 330 | 5,414E-03 | 630 | 1,115E-01 | 930 | 1,165E-05 | 1350 | 5,506E-02 | 2850 | 7,696E-01 | 4350 | 1,280E-02 |
| 340 | 7,963E-02 | 640 | 6,907E-02 | 940 | 1,541E-05 | 1400 | 9,391E-02 | 2900 | 6,891E-01 | 4400 | 1,197E-02 |
| 350 | 2,609E-01 | 650 | 4,086E-02 | 950 | 1,755E-05 | 1450 | 1,474E-01 | 2950 | 6,267E-01 | 4450 | 9,752E-03 |
| 360 | 4,385E-01 | 660 | 2,302E-02 | 960 | 2,479E-05 | 1500 | 2,108E-01 | 3000 | 5,754E-01 | 4500 | 7,643E-03 |
| 370 | 5,592E-01 | 670 | 1,251E-02 | 970 | 2,870E-05 | 1550 | 2,833E-01 | 3050 | 5,287E-01 | 4550 | 6,426E-03 |
| 380 | 6,359E-01 | 680 | 6,564E-03 | 980 | 4,020E-05 | 1600 | 3,593E-01 | 3100 | 4,846E-01 | 4600 | 6,306E-03 |
| 390 | 6,861E-01 | 690 | 3,364E-03 | 990 | 4,506E-05 | 1650 | 4,329E-01 | 3150 | 4,432E-01 | 4650 | 8,001E-03 |
| 400 | 7,241E-01 | 700 | 1,703E-03 | 1000 | 6,306E-05 | 1700 | 5,028E-01 | 3200 | 4,065E-01 | 4700 | 1,261E-02 |
| 410 | 7,548E-01 | 710 | 8,557E-04 | 1010 | 8,451E-05 | 1750 | 5,686E-01 | 3250 | 3,749E-01 | 4750 | 2,046E-02 |
| 420 | 7,817E-01 | 720 | 4,359E-04 | 1020 | 1,094E-04 | 1800 | 6,275E-01 | 3300 | 3,489E-01 | 4800 | 3,035E-02 |
| 430 | 8,047E-01 | 730 | 2,284E-04 | 1030 | 1,406E-04 | 1850 | 6,784E-01 | 3350 | 3,284E-01 | 4850 | 4,167E-02 |
| 440 | 8,263E-01 | 740 | 1,222E-04 | 1040 | 1,816E-04 | 1900 | 7,221E-01 | 3400 | 3,129E-01 | 4900 | 5,510E-02 |
| 450 | 8,455E-01 | 750 | 6,774E-05 | 1050 | 2,297E-04 | 1950 | 7,604E-01 | 3450 | 3,039E-01 | 4950 | 7,229E-02 |
| 460 | 8,620E-01 | 760 | 3,935E-05 | 1060 | 2,932E-04 | 2000 | 7,928E-01 | 3500 | 3,002E-01 | 5000 | 9,193E-02 |
| 470 | 8,761E-01 | 770 | 2,448E-05 | 1070 | 3,653E-04 | 2050 | 8,197E-01 | 3550 | 3,034E-01 | 5050 | 1,109E-01 |
| 480 | 8,878E-01 | 780 | 1,610E-05 | 1080 | 4,627E-04 | 2100 | 8,428E-01 | 3600 | 3,118E-01 | 5100 | 1,255E-01 |
| 490 | 8,965E-01 | 790 | 1,109E-05 | 1090 | 5,805E-04 | 2150 | 8,618E-01 | 3650 | 3,260E-01 | 5150 | 1,323E-01 |

# Data Sheet

## BG62HT

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,914 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,8 |
| $\tau_i$ (514 nm) | | ≥ | 0,9 |
| $\tau_i$ (633 nm) | | ≥ | 0,08 |
| $\tau_i$ (694 nm) | | ≤ | 0,004 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0005 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 340 nm to 1550 nm | | | |
| $B_1$ | 1,2129 | | |
| $B_2$ | 0,1238 | | |
| $B_3$ | 0,0621 | | |
| $C_1$ | 6,667E-03 | µm² | |
| $C_2$ | 3,0034E-02 | µm² | |
| $C_3$ | 12,219 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

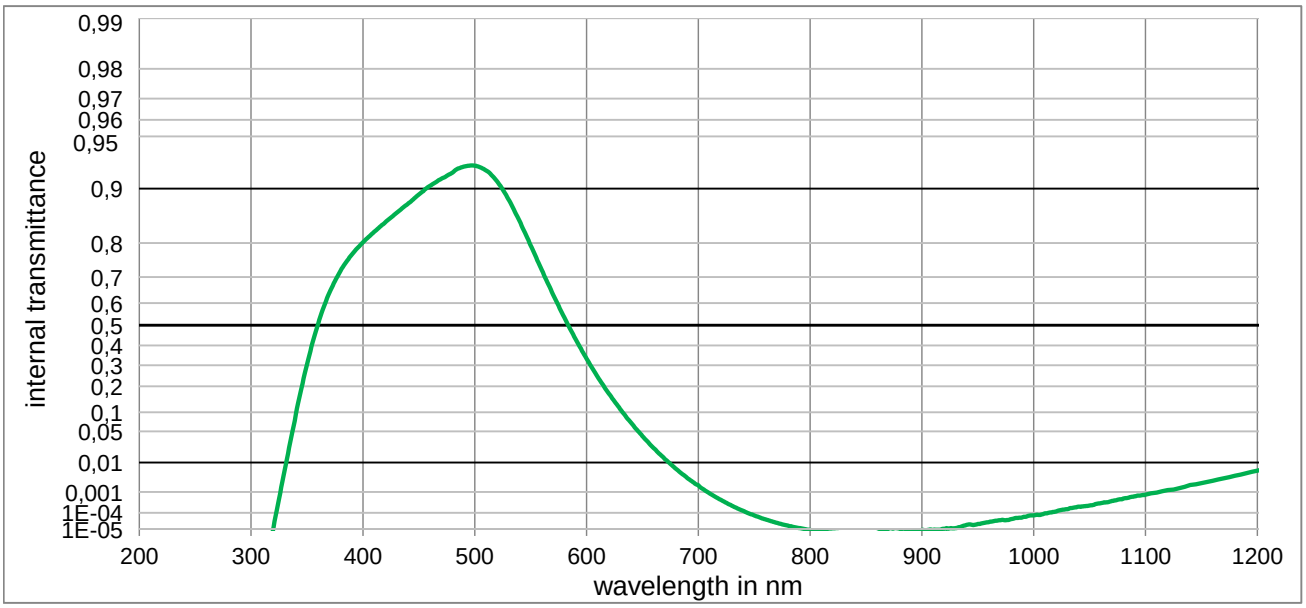
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 410 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 11,8 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,7 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,226 | 0,191 | 0,172 |
| | y | 0,314 | 0,299 | 0,288 |
| | Y | 60,8 | 46,6 | 37,7 |
| | $\lambda_d$ | 489 nm | 489 nm | 488 nm |
| | $P_e$ | 0,326 | 0,468 | 0,546 |
| Illuminant A | x | 0,317 | 0,252 | 0,215 |
| | y | 0,438 | 0,438 | 0,430 |
| | Y | 52,0 | 36,9 | 28,4 |
| | $\lambda_d$ | 499 nm | 497 nm | 496 nm |
| | $P_e$ | 0,299 | 0,452 | 0,542 |

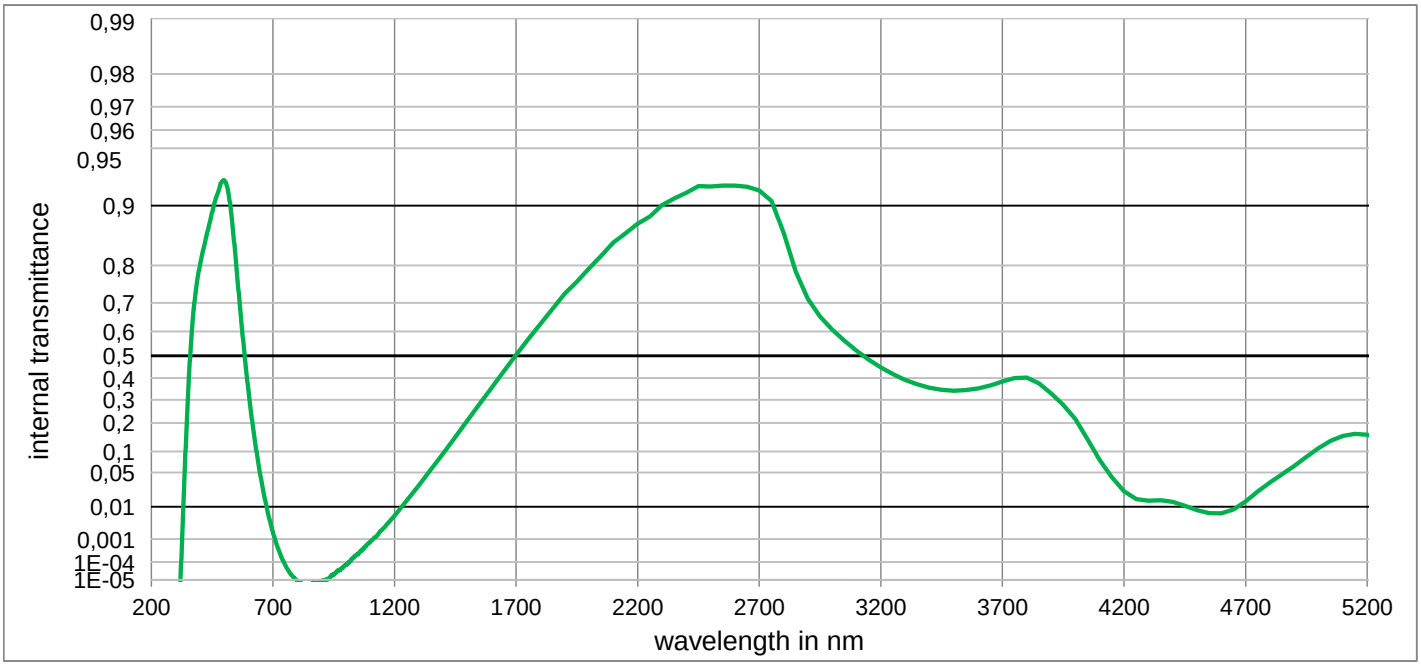
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.21mm) = 644 nm |
| DIN 58131 |

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



# Data Sheet

## BG62HT




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 9,261E-01 | 800 | < | 1,000E-05 | 1100 | 7,708E-04 | 2200 | 8,764E-01 | 3700 | 3,841E-01 |
| 210 | < | 1,0E-05 | 510 | 9,214E-01 | 810 | < | 1,000E-05 | 1110 | 9,495E-04 | 2250 | 8,864E-01 | 3750 | 4,004E-01 |
| 220 | < | 1,0E-05 | 520 | 9,089E-01 | 820 | < | 1,000E-05 | 1120 | 1,194E-03 | 2300 | 9,006E-01 | 3800 | 4,015E-01 |
| 230 | < | 1,0E-05 | 530 | 8,856E-01 | 830 | < | 1,000E-05 | 1130 | 1,417E-03 | 2350 | 9,081E-01 | 3850 | 3,755E-01 |
| 240 | < | 1,0E-05 | 540 | 8,483E-01 | 840 | < | 1,000E-05 | 1140 | 1,889E-03 | 2400 | 9,143E-01 | 3900 | 3,297E-01 |
| 250 | < | 1,0E-05 | 550 | 7,945E-01 | 850 | < | 1,000E-05 | 1150 | 2,190E-03 | 2450 | 9,208E-01 | 3950 | 2,780E-01 |
| 260 | < | 1,0E-05 | 560 | 7,232E-01 | 860 | < | 1,000E-05 | 1160 | 2,656E-03 | 2500 | 9,204E-01 | 4000 | 2,153E-01 |
| 270 | < | 1,0E-05 | 570 | 6,361E-01 | 870 | < | 1,000E-05 | 1170 | 3,280E-03 | 2550 | 9,214E-01 | 4050 | 1,386E-01 |
| 280 | < | 1,0E-05 | 580 | 5,373E-01 | 880 | < | 1,000E-05 | 1180 | 3,977E-03 | 2600 | 9,213E-01 | 4100 | 7,754E-02 |
| 290 | < | 1,0E-05 | 590 | 4,338E-01 | 890 | < | 1,000E-05 | 1190 | 4,816E-03 | 2650 | 9,202E-01 | 4150 | 4,183E-02 |
| 300 | < | 1,0E-05 | 600 | 3,335E-01 | 900 | < | 1,000E-05 | 1200 | 5,792E-03 | 2700 | 9,166E-01 | 4200 | 2,268E-02 |
| 310 | < | 1,0E-05 | 610 | 2,433E-01 | 910 | < | 1,000E-05 | 1250 | 1,420E-02 | 2750 | 9,057E-01 | 4250 | 1,526E-02 |
| 320 | | 1,339E-05 | 620 | 1,683E-01 | 920 | | 1,017E-05 | 1300 | 2,938E-02 | 2800 | 8,625E-01 | 4300 | 1,405E-02 |
| 330 | | 5,930E-03 | 630 | 1,110E-01 | 930 | | 1,146E-05 | 1350 | 5,598E-02 | 2850 | 7,851E-01 | 4350 | 1,440E-02 |
| 340 | | 9,512E-02 | 640 | 6,912E-02 | 940 | | 1,861E-05 | 1400 | 9,470E-02 | 2900 | 7,123E-01 | 4400 | 1,317E-02 |
| 350 | | 3,042E-01 | 650 | 4,089E-02 | 950 | | 2,151E-05 | 1450 | 1,470E-01 | 2950 | 6,549E-01 | 4450 | 1,057E-02 |
| 360 | | 5,087E-01 | 660 | 2,308E-02 | 960 | | 2,868E-05 | 1500 | 2,097E-01 | 3000 | 6,073E-01 | 4500 | 8,216E-03 |
| 370 | | 6,420E-01 | 670 | 1,259E-02 | 970 | | 3,657E-05 | 1550 | 2,813E-01 | 3050 | 5,638E-01 | 4550 | 6,843E-03 |
| 380 | | 7,214E-01 | 680 | 6,615E-03 | 980 | | 4,364E-05 | 1600 | 3,563E-01 | 3100 | 5,224E-01 | 4600 | 6,690E-03 |
| 390 | | 7,694E-01 | 690 | 3,406E-03 | 990 | | 5,597E-05 | 1650 | 4,329E-01 | 3150 | 4,834E-01 | 4650 | 8,518E-03 |
| 400 | | 8,016E-01 | 700 | 1,849E-03 | 1000 | | 7,191E-05 | 1700 | 5,036E-01 | 3200 | 4,482E-01 | 4700 | 1,353E-02 |
| 410 | | 8,257E-01 | 710 | 8,801E-04 | 1010 | | 9,398E-05 | 1750 | 5,702E-01 | 3250 | 4,175E-01 | 4750 | 2,221E-02 |
| 420 | | 8,456E-01 | 720 | 4,531E-04 | 1020 | | 1,185E-04 | 1800 | 6,281E-01 | 3300 | 3,919E-01 | 4800 | 3,359E-02 |
| 430 | | 8,627E-01 | 730 | 2,360E-04 | 1030 | | 1,571E-04 | 1850 | 6,812E-01 | 3350 | 3,714E-01 | 4850 | 4,702E-02 |
| 440 | | 8,779E-01 | 740 | 1,276E-04 | 1040 | | 2,103E-04 | 1900 | 7,279E-01 | 3400 | 3,556E-01 | 4900 | 6,337E-02 |
| 450 | | 8,919E-01 | 750 | 7,146E-05 | 1050 | | 2,391E-04 | 1950 | 7,606E-01 | 3450 | 3,461E-01 | 4950 | 8,489E-02 |
| 460 | | 9,036E-01 | 760 | 4,179E-05 | 1060 | | 3,161E-04 | 2000 | 7,936E-01 | 3500 | 3,419E-01 | 5000 | 1,098E-01 |
| 470 | | 9,121E-01 | 770 | 2,577E-05 | 1070 | | 4,016E-04 | 2050 | 8,208E-01 | 3550 | 3,445E-01 | 5050 | 1,335E-01 |
| 480 | | 9,190E-01 | 780 | 1,695E-05 | 1080 | | 5,109E-04 | 2100 | 8,458E-01 | 3600 | 3,524E-01 | 5100 | 1,508E-01 |
| 490 | | 9,251E-01 | 790 | 1,170E-05 | 1090 | | 6,481E-04 | 2150 | 8,616E-01 | 3650 | 3,662E-01 | 5150 | 1,578E-01 |

# Data Sheet

## BG63

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,915 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,95 |
| $\tau_i$ (514 nm) | | ≥ | 0,96 |
| $\tau_i$ (633 nm) | | ≥ | 0,5 |
| $\tau_i$ (694 nm) | | ≤ | 0,25 |
| $\tau_i$ (1060 nm) | | ≤ | 0,16 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,53 |
| $n_d$ (587,6 nm) | | = | 1,53 |
| **Sellmeier coefficients** | | | |
| valid from 365 nm to 2325 nm | | | |
| $B_1$ | | | 1,3115 |
| $B_2$ | | | 0,0046 |
| $B_3$ | | | 0,3087 |
| $C_1$ | | | 8,469E-03 µm² |
| $C_2$ | | | 5,7634E-02 µm² |
| $C_3$ | | | 46,721 µm² |
| **Internal quality** | | | |
| Bubble class | | | 2 |

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

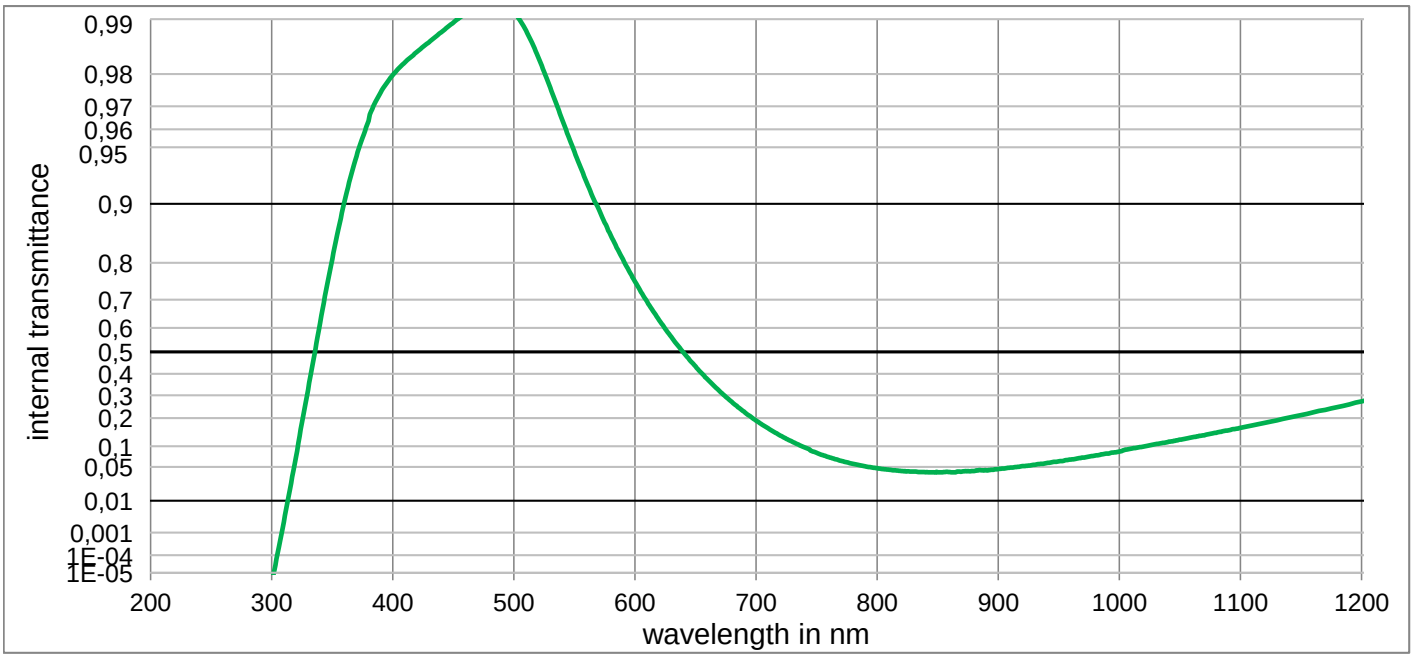
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 416 °C |
| **Thermal expansion in** | | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | | = | 11,9 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,9 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,280 | 0,255 | 0,237 |
| | y | 0,325 | 0,319 | 0,313 |
| | Y | 80,9 | 73,0 | 67,0 |
| | $\lambda_d$ | 490 nm | 489 nm | 489 nm |
| | $P_e$ | 0,123 | 0,216 | 0,289 |
| Illuminant A | x | 0,403 | 0,366 | 0,336 |
| | y | 0,420 | 0,428 | 0,432 |
| | Y | 76,5 | 66,2 | 58,6 |
| | $\lambda_d$ | 500 nm | 499 nm | 499 nm |
| | $P_e$ | 0,102 | 0,186 | 0,256 |

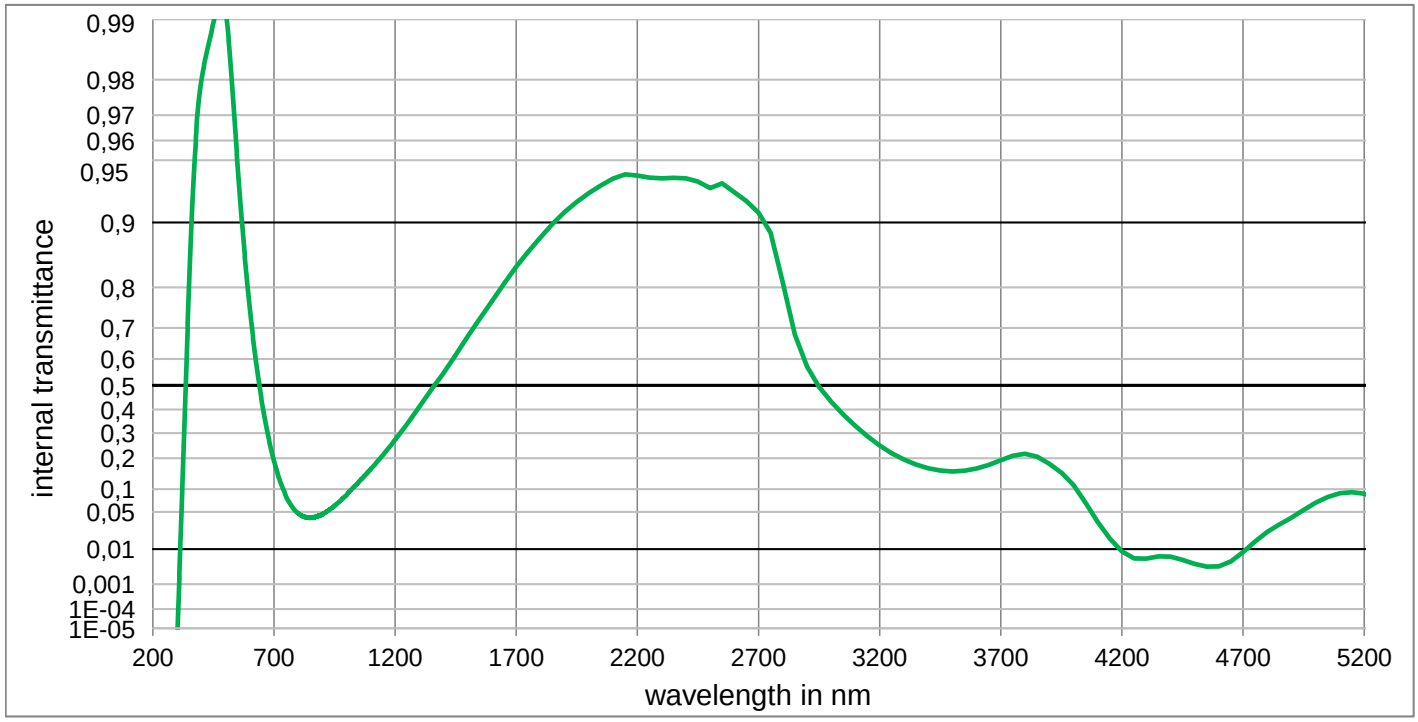
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=1.5mm) = 614 nm |
| DIN 58131 |

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



# Data Sheet

## BG63




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,909E-01 | 800 | 4,771E-02 | 1100 | 1,621E-01 | 2200 | 9,406E-01 | 3700 | 1,921E-01 |
| 210 | < 1,0E-05 | 510 | 9,885E-01 | 810 | 4,471E-02 | 1110 | 1,714E-01 | 2250 | 9,393E-01 | 3750 | 2,095E-01 |
| 220 | < 1,0E-05 | 520 | 9,839E-01 | 820 | 4,271E-02 | 1120 | 1,806E-01 | 2300 | 9,388E-01 | 3800 | 2,171E-01 |
| 230 | < 1,0E-05 | 530 | 9,763E-01 | 830 | 4,174E-02 | 1130 | 1,912E-01 | 2350 | 9,391E-01 | 3850 | 2,055E-01 |
| 240 | < 1,0E-05 | 540 | 9,644E-01 | 840 | 4,061E-02 | 1140 | 2,015E-01 | 2400 | 9,387E-01 | 3900 | 1,796E-01 |
| 250 | < 1,0E-05 | 550 | 9,471E-01 | 850 | 4,057E-02 | 1150 | 2,122E-01 | 2450 | 9,364E-01 | 3950 | 1,492E-01 |
| 260 | < 1,0E-05 | 560 | 9,232E-01 | 860 | 4,065E-02 | 1160 | 2,240E-01 | 2500 | 9,317E-01 | 4000 | 1,114E-01 |
| 270 | < 1,0E-05 | 570 | 8,935E-01 | 870 | 4,149E-02 | 1170 | 2,349E-01 | 2550 | 9,352E-01 | 4050 | 6,722E-02 |
| 280 | < 1,0E-05 | 580 | 8,543E-01 | 880 | 4,238E-02 | 1180 | 2,467E-01 | 2600 | 9,284E-01 | 4100 | 3,475E-02 |
| 290 | < 1,0E-05 | 590 | 8,076E-01 | 890 | 4,391E-02 | 1190 | 2,591E-01 | 2650 | 9,210E-01 | 4150 | 1,686E-02 |
| 300 | < 1,0E-05 | 600 | 7,536E-01 | 900 | 4,619E-02 | 1200 | 2,726E-01 | 2700 | 9,101E-01 | 4200 | 8,809E-03 |
| 310 | 2,4E-03 | 610 | 6,937E-01 | 910 | 4,868E-02 | 1250 | 3,398E-01 | 2750 | 8,881E-01 | 4250 | 5,895E-03 |
| 320 | 7,008E-02 | 620 | 6,295E-01 | 920 | 5,153E-02 | 1300 | 4,115E-01 | 2800 | 8,095E-01 | 4300 | 5,826E-03 |
| 330 | 3,265E-01 | 630 | 5,632E-01 | 930 | 5,418E-02 | 1350 | 4,843E-01 | 2850 | 6,807E-01 | 4350 | 6,643E-03 |
| 340 | 6,188E-01 | 640 | 4,980E-01 | 940 | 5,756E-02 | 1400 | 5,477E-01 | 2900 | 5,725E-01 | 4400 | 6,550E-03 |
| 350 | 8,085E-01 | 650 | 4,343E-01 | 950 | 6,141E-02 | 1450 | 6,145E-01 | 2950 | 4,941E-01 | 4450 | 5,416E-03 |
| 360 | 9,020E-01 | 660 | 3,734E-01 | 960 | 6,548E-02 | 1500 | 6,746E-01 | 3000 | 4,325E-01 | 4500 | 4,256E-03 |
| 370 | 9,441E-01 | 670 | 3,185E-01 | 970 | 6,997E-02 | 1550 | 7,266E-01 | 3050 | 3,786E-01 | 4550 | 3,563E-03 |
| 380 | 9,639E-01 | 680 | 2,695E-01 | 980 | 7,511E-02 | 1600 | 7,697E-01 | 3100 | 3,298E-01 | 4600 | 3,622E-03 |
| 390 | 9,748E-01 | 690 | 2,267E-01 | 990 | 7,958E-02 | 1650 | 8,079E-01 | 3150 | 2,863E-01 | 4650 | 4,923E-03 |
| 400 | 9,797E-01 | 700 | 1,900E-01 | 1000 | 8,513E-02 | 1700 | 8,387E-01 | 3200 | 2,493E-01 | 4700 | 8,493E-03 |
| 410 | 9,827E-01 | 710 | 1,594E-01 | 1010 | 9,301E-02 | 1750 | 8,629E-01 | 3250 | 2,191E-01 | 4750 | 1,485E-02 |
| 420 | 9,849E-01 | 720 | 1,340E-01 | 1020 | 9,917E-02 | 1800 | 8,822E-01 | 3300 | 1,952E-01 | 4800 | 2,293E-02 |
| 430 | 9,867E-01 | 730 | 1,133E-01 | 1030 | 1,063E-01 | 1850 | 8,987E-01 | 3350 | 1,771E-01 | 4850 | 3,124E-02 |
| 440 | 9,882E-01 | 740 | 9,696E-02 | 1040 | 1,124E-01 | 1900 | 9,108E-01 | 3400 | 1,640E-01 | 4900 | 4,079E-02 |
| 450 | 9,896E-01 | 750 | 8,151E-02 | 1050 | 1,202E-01 | 1950 | 9,204E-01 | 3450 | 1,564E-01 | 4950 | 5,353E-02 |
| 460 | 9,907E-01 | 760 | 7,097E-02 | 1060 | 1,282E-01 | 2000 | 9,277E-01 | 3500 | 1,535E-01 | 5000 | 6,786E-02 |
| 470 | 9,915E-01 | 770 | 6,270E-02 | 1070 | 1,348E-01 | 2050 | 9,336E-01 | 3550 | 1,559E-01 | 5050 | 8,079E-02 |
| 480 | 9,919E-01 | 780 | 5,639E-02 | 1080 | 1,437E-01 | 2100 | 9,385E-01 | 3600 | 1,629E-01 | 5100 | 8,941E-02 |
| 490 | 9,919E-01 | 790 | 5,125E-02 | 1090 | 1,522E-01 | 2150 | 9,414E-01 | 3650 | 1,752E-01 | 5150 | 9,218E-02 |

# Data Sheet

## BG64

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,916 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,99 |
| $\tau_i$ (514 nm) | | ≥ | 0,99 |
| $\tau_i$ (633 nm) | | ≥ | 0,72 |
| $\tau_i$ (694 nm) | | ≤ | 0,55 |
| $\tau_i$ (1060 nm) | | ≤ | 0,45 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,53 |
| $n_d$ (587,6 nm) | | = | 1,53 |
| **Sellmeier coefficients** | | | |
| valid from 365 nm to 2325 nm | | | |
| $B_1$ | 1,3031 | | |
| $B_2$ | 0,0067 | | |
| $B_3$ | 0,4940 | | |
| $C_1$ | 8,159E-03 µm² | | |
| $C_2$ | 5,5599E-02 µm² | | |
| $C_3$ | 69,869 µm² | | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

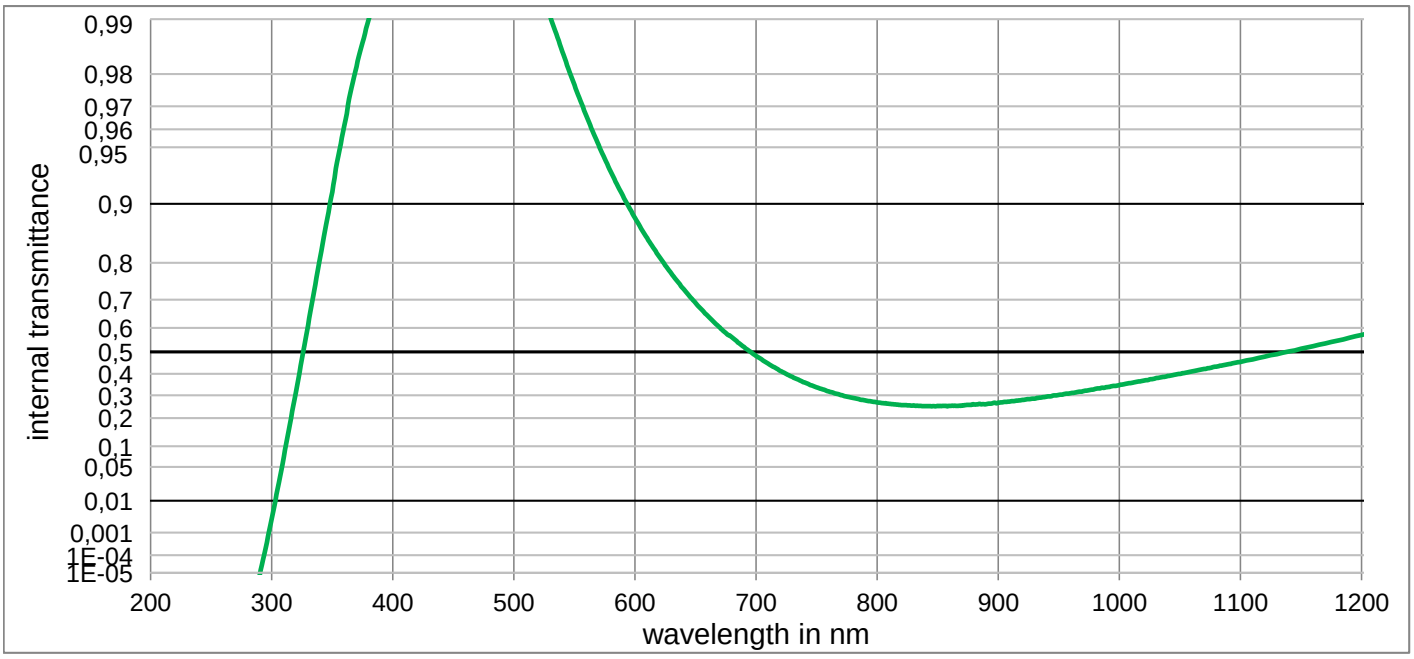
| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 2,78 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 371 |

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

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

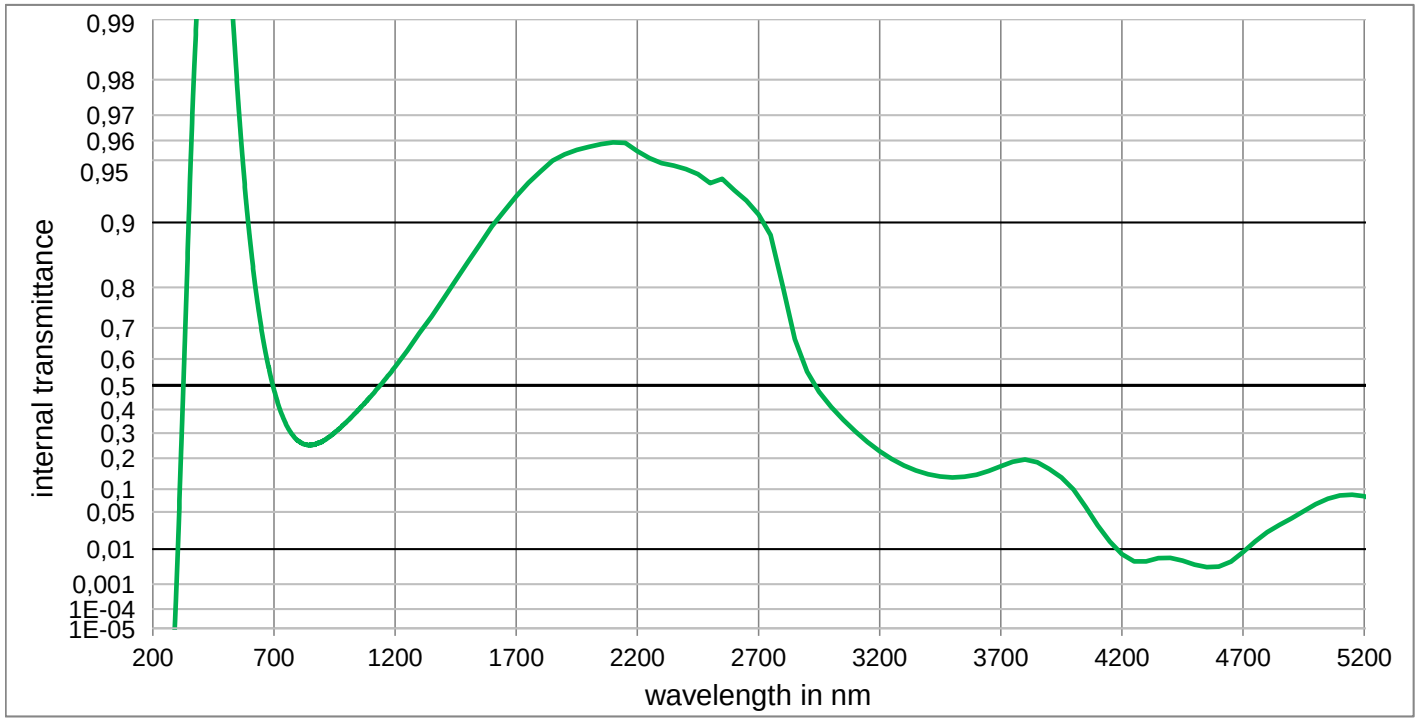
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,297 | 0,284 | 0,272 |
| | y | 0,327 | 0,325 | 0,323 |
| | Y | 86,6 | 82,4 | 78,6 |
| | $\lambda_d$ | 490 nm | 490 nm | 490 nm |
| | $P_e$ | 0,058 | 0,109 | 0,154 |
| Illuminant A | x | 0,427 | 0,408 | 0,391 |
| | y | 0,414 | 0,419 | 0,423 |
| | Y | 84,4 | 78,4 | 73,3 |
| | $\lambda_d$ | 500 nm | 500 nm | 500 nm |
| | $P_e$ | 0,047 | 0,089 | 0,129 |

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=3mm) = 619 nm |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## BG64




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,971E-01 | 800 | 2,682E-01 | 1100 | 4,553E-01 | 2200 | 9,549E-01 | 3700 | 1,706E-01 |
| 210 | < 1,0E-05 | 510 | 9,959E-01 | 810 | 2,611E-01 | 1110 | 4,666E-01 | 2250 | 9,512E-01 | 3750 | 1,874E-01 |
| 220 | < 1,0E-05 | 520 | 9,938E-01 | 820 | 2,558E-01 | 1120 | 4,786E-01 | 2300 | 9,484E-01 | 3800 | 1,951E-01 |
| 230 | < 1,0E-05 | 530 | 9,903E-01 | 830 | 2,539E-01 | 1130 | 4,896E-01 | 2350 | 9,469E-01 | 3850 | 1,849E-01 |
| 240 | < 1,0E-05 | 540 | 9,850E-01 | 840 | 2,511E-01 | 1140 | 5,017E-01 | 2400 | 9,447E-01 | 3900 | 1,614E-01 |
| 250 | < 1,0E-05 | 550 | 9,770E-01 | 850 | 2,523E-01 | 1150 | 5,137E-01 | 2450 | 9,416E-01 | 3950 | 1,338E-01 |
| 260 | < 1,0E-05 | 560 | 9,660E-01 | 860 | 2,522E-01 | 1160 | 5,248E-01 | 2500 | 9,354E-01 | 4000 | 9,910E-02 |
| 270 | < 1,0E-05 | 570 | 9,513E-01 | 870 | 2,539E-01 | 1170 | 5,370E-01 | 2550 | 9,383E-01 | 4050 | 5,906E-02 |
| 280 | < 1,0E-05 | 580 | 9,324E-01 | 880 | 2,592E-01 | 1180 | 5,479E-01 | 2600 | 9,299E-01 | 4100 | 3,025E-02 |
| 290 | < 1,0E-05 | 590 | 9,093E-01 | 890 | 2,601E-01 | 1190 | 5,602E-01 | 2650 | 9,214E-01 | 4150 | 1,459E-02 |
| 300 | 3,0E-03 | 600 | 8,816E-01 | 900 | 2,661E-01 | 1200 | 5,719E-01 | 2700 | 9,084E-01 | 4200 | 7,556E-03 |
| 310 | 7,2E-02 | 610 | 8,496E-01 | 910 | 2,722E-01 | 1250 | 6,292E-01 | 2750 | 8,853E-01 | 4250 | 4,980E-03 |
| 320 | 3,138E-01 | 620 | 8,137E-01 | 920 | 2,787E-01 | 1300 | 6,842E-01 | 2800 | 8,020E-01 | 4300 | 4,985E-03 |
| 330 | 6,101E-01 | 630 | 7,745E-01 | 930 | 2,850E-01 | 1350 | 7,313E-01 | 2850 | 6,664E-01 | 4350 | 6,061E-03 |
| 340 | 8,116E-01 | 640 | 7,328E-01 | 940 | 2,938E-01 | 1400 | 7,753E-01 | 2900 | 5,540E-01 | 4400 | 6,099E-03 |
| 350 | 9,134E-01 | 650 | 6,894E-01 | 950 | 3,014E-01 | 1450 | 8,142E-01 | 2950 | 4,734E-01 | 4450 | 5,149E-03 |
| 360 | 9,618E-01 | 660 | 6,452E-01 | 960 | 3,100E-01 | 1500 | 8,461E-01 | 3000 | 4,106E-01 | 4500 | 4,072E-03 |
| 370 | 9,818E-01 | 670 | 6,013E-01 | 970 | 3,187E-01 | 1550 | 8,733E-01 | 3050 | 3,560E-01 | 4550 | 3,468E-03 |
| 380 | 9,899E-01 | 680 | 5,625E-01 | 980 | 3,291E-01 | 1600 | 8,959E-01 | 3100 | 3,067E-01 | 4600 | 3,580E-03 |
| 390 | 9,935E-01 | 690 | 5,212E-01 | 990 | 3,379E-01 | 1650 | 9,119E-01 | 3150 | 2,634E-01 | 4650 | 4,884E-03 |
| 400 | 9,950E-01 | 700 | 4,821E-01 | 1000 | 3,475E-01 | 1700 | 9,252E-01 | 3200 | 2,268E-01 | 4700 | 8,466E-03 |
| 410 | 9,959E-01 | 710 | 4,471E-01 | 1010 | 3,575E-01 | 1750 | 9,356E-01 | 3250 | 1,972E-01 | 4750 | 1,487E-02 |
| 420 | 9,962E-01 | 720 | 4,140E-01 | 1020 | 3,681E-01 | 1800 | 9,432E-01 | 3300 | 1,740E-01 | 4800 | 2,278E-02 |
| 430 | 9,966E-01 | 730 | 3,852E-01 | 1030 | 3,793E-01 | 1850 | 9,497E-01 | 3350 | 1,565E-01 | 4850 | 3,076E-02 |
| 440 | 9,970E-01 | 740 | 3,593E-01 | 1040 | 3,898E-01 | 1900 | 9,532E-01 | 3400 | 1,440E-01 | 4900 | 3,956E-02 |
| 450 | 9,973E-01 | 750 | 3,369E-01 | 1050 | 3,999E-01 | 1950 | 9,556E-01 | 3450 | 1,367E-01 | 4950 | 5,139E-02 |
| 460 | 9,976E-01 | 760 | 3,175E-01 | 1060 | 4,107E-01 | 2000 | 9,570E-01 | 3500 | 1,339E-01 | 5000 | 6,452E-02 |
| 470 | 9,977E-01 | 770 | 3,011E-01 | 1070 | 4,223E-01 | 2050 | 9,583E-01 | 3550 | 1,362E-01 | 5050 | 7,625E-02 |
| 480 | 9,977E-01 | 780 | 2,879E-01 | 1080 | 4,326E-01 | 2100 | 9,591E-01 | 3600 | 1,428E-01 | 5100 | 8,386E-02 |
| 490 | 9,977E-01 | 790 | 2,763E-01 | 1090 | 4,452E-01 | 2150 | 9,589E-01 | 3650 | 1,544E-01 | 5150 | 8,586E-02 |

# Data Sheet

## BG66

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,914 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (430 nm) | | ≥ | 0,815 |
| $\tau_i$ (514 nm) | | ≥ | 0,89 |
| $\tau_i$ (565 nm) | | ≥ | 0,615 |
| $\tau_i$ (694 nm) | | ≤ | 0,0015 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0002 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,54 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | 1,3353 | | |
| $B_2$ | 0,0004 | | |
| $B_3$ | 0,6203 | | |
| $C_1$ | 8,684E-03 | µm² | |
| $C_2$ | 2,0582E-02 | µm² | |
| $C_3$ | 100,000 | µm² | |
| **Internal quality** | | | |
| Bubble class | 0 | | |

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

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

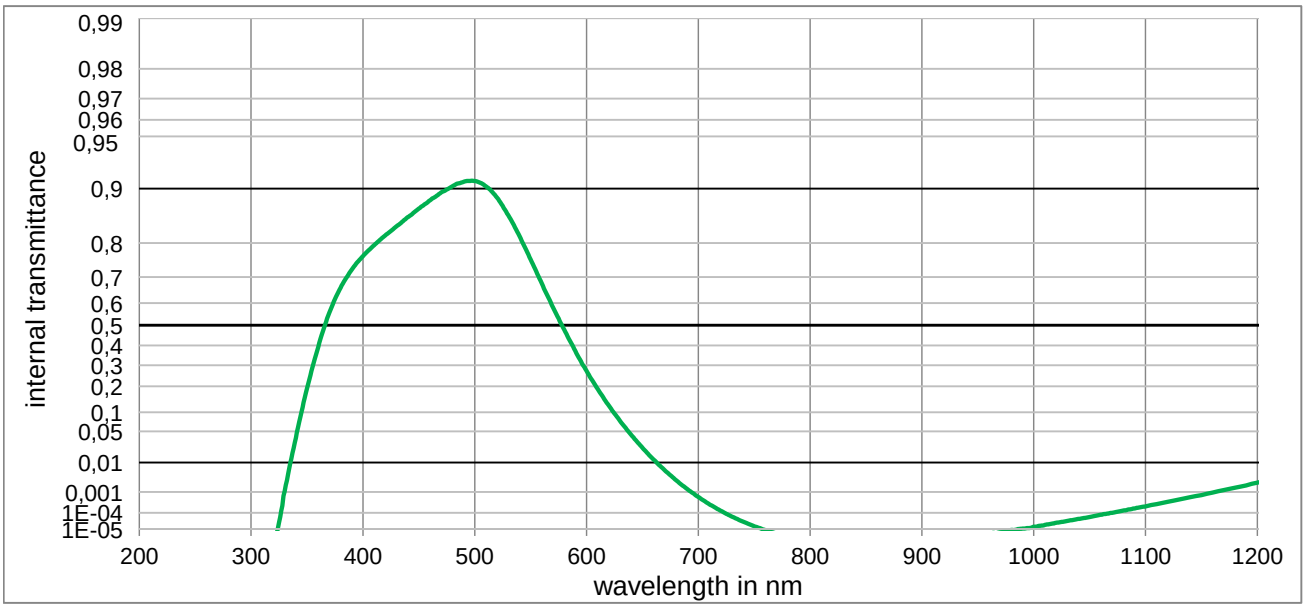
| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | | |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,218 | 0,183 | 0,165 |
| | y | 0,313 | 0,297 | 0,286 |
| | Y | 57,0 | 42,1 | 33,1 |
| | $\lambda_d$ | 489 nm | 489 nm | 488 nm |
| | $P_e$ | 0,356 | 0,497 | 0,571 |
| Illuminant A | x | 0,303 | 0,237 | 0,202 |
| | y | 0,440 | 0,438 | 0,429 |
| | Y | 48,0 | 32,8 | 24,5 |
| | $\lambda_d$ | 499 nm | 497 nm | 496 nm |
| | $P_e$ | 0,332 | 0,487 | 0,574 |

| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.21mm) @ 635 nm |
| DIN 58131 |

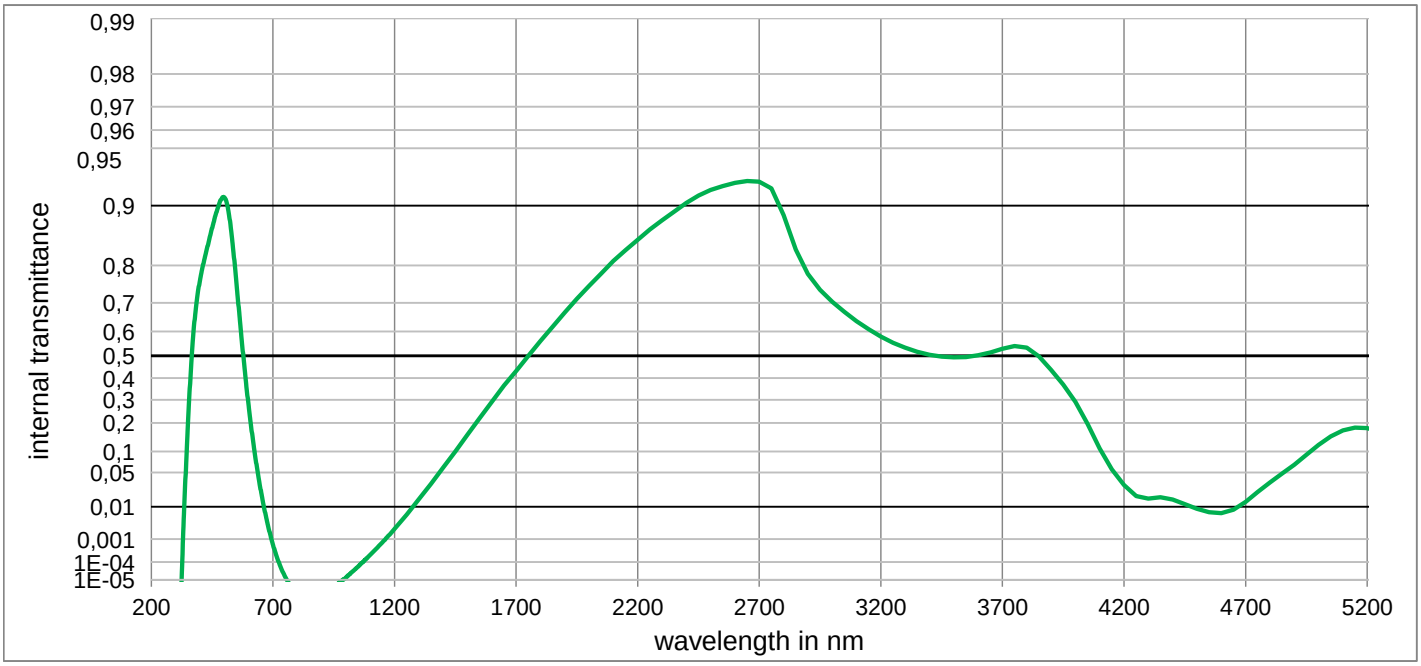
**Disclaimer**

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



# Data Sheet

## BG66




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 9,094E-01 | 800 | < | 1,000E-05 | 1100 | 2,196E-04 | 2200 | 8,507E-01 | 3700 | 5,296E-01 |
| 210 | < | 1,0E-05 | 510 | 9,031E-01 | 810 | < | 1,000E-05 | 1110 | 2,858E-04 | 2250 | 8,676E-01 | 3750 | 5,413E-01 |
| 220 | < | 1,0E-05 | 520 | 8,874E-01 | 820 | < | 1,000E-05 | 1120 | 3,654E-04 | 2300 | 8,810E-01 | 3800 | 5,348E-01 |
| 230 | < | 1,0E-05 | 530 | 8,590E-01 | 830 | < | 1,000E-05 | 1130 | 4,675E-04 | 2350 | 8,927E-01 | 3850 | 4,976E-01 |
| 240 | < | 1,0E-05 | 540 | 8,165E-01 | 840 | < | 1,000E-05 | 1140 | 5,998E-04 | 2400 | 9,031E-01 | 3900 | 4,373E-01 |
| 250 | < | 1,0E-05 | 550 | 7,560E-01 | 850 | < | 1,000E-05 | 1150 | 7,406E-04 | 2450 | 9,113E-01 | 3950 | 3,702E-01 |
| 260 | < | 1,0E-05 | 560 | 6,770E-01 | 860 | < | 1,000E-05 | 1160 | 9,407E-04 | 2500 | 9,170E-01 | 4000 | 2,907E-01 |
| 270 | < | 1,0E-05 | 570 | 5,822E-01 | 870 | < | 1,000E-05 | 1170 | 1,191E-03 | 2550 | 9,209E-01 | 4050 | 1,956E-01 |
| 280 | < | 1,0E-05 | 580 | 4,782E-01 | 880 | < | 1,000E-05 | 1180 | 1,473E-03 | 2600 | 9,239E-01 | 4100 | 1,091E-01 |
| 290 | < | 1,0E-05 | 590 | 3,726E-01 | 890 | < | 1,000E-05 | 1190 | 1,816E-03 | 2650 | 9,256E-01 | 4150 | 5,625E-02 |
| 300 | < | 1,0E-05 | 600 | 2,720E-01 | 900 | < | 1,000E-05 | 1200 | 2,301E-03 | 2700 | 9,250E-01 | 4200 | 2,989E-02 |
| 310 | < | 1,0E-05 | 610 | 1,883E-01 | 910 | < | 1,000E-05 | 1250 | 6,219E-03 | 2750 | 9,187E-01 | 4250 | 1,788E-02 |
| 320 | < | 1,000E-05 | 620 | 1,222E-01 | 920 | < | 1,000E-05 | 1300 | 1,501E-02 | 2800 | 8,882E-01 | 4300 | 1,572E-02 |
| 330 | | 1,069E-03 | 630 | 7,459E-02 | 930 | < | 1,000E-05 | 1350 | 3,166E-02 | 2850 | 8,326E-01 | 4350 | 1,676E-02 |
| 340 | | 3,817E-02 | 640 | 4,295E-02 | 940 | < | 1,000E-05 | 1400 | 5,986E-02 | 2900 | 7,804E-01 | 4400 | 1,484E-02 |
| 350 | | 1,903E-01 | 650 | 2,347E-02 | 950 | < | 1,000E-05 | 1450 | 1,006E-01 | 2950 | 7,387E-01 | 4450 | 1,165E-02 |
| 360 | | 3,932E-01 | 660 | 1,207E-02 | 960 | < | 1,000E-05 | 1500 | 1,543E-01 | 3000 | 7,035E-01 | 4500 | 8,858E-03 |
| 370 | | 5,584E-01 | 670 | 5,939E-03 | 970 | < | 1,000E-05 | 1550 | 2,192E-01 | 3050 | 6,707E-01 | 4550 | 7,190E-03 |
| 380 | | 6,617E-01 | 680 | 2,832E-03 | 980 | < | 1,000E-05 | 1600 | 2,908E-01 | 3100 | 6,389E-01 | 4600 | 6,838E-03 |
| 390 | | 7,246E-01 | 690 | 1,320E-03 | 990 | | 1,054E-05 | 1650 | 3,659E-01 | 3150 | 6,083E-01 | 4650 | 8,472E-03 |
| 400 | | 7,656E-01 | 700 | 6,092E-04 | 1000 | | 1,418E-05 | 1700 | 4,320E-01 | 3200 | 5,802E-01 | 4700 | 1,325E-02 |
| 410 | | 7,944E-01 | 710 | 2,779E-04 | 1010 | | 1,905E-05 | 1750 | 4,998E-01 | 3250 | 5,554E-01 | 4750 | 2,175E-02 |
| 420 | | 8,179E-01 | 720 | 1,290E-04 | 1020 | | 2,566E-05 | 1800 | 5,622E-01 | 3300 | 5,344E-01 | 4800 | 3,342E-02 |
| 430 | | 8,373E-01 | 730 | 6,140E-05 | 1030 | | 3,340E-05 | 1850 | 6,185E-01 | 3350 | 5,175E-01 | 4850 | 4,796E-02 |
| 440 | | 8,553E-01 | 740 | 3,033E-05 | 1040 | | 4,450E-05 | 1900 | 6,680E-01 | 3400 | 5,044E-01 | 4900 | 6,617E-02 |
| 450 | | 8,702E-01 | 750 | 1,534E-05 | 1050 | | 5,799E-05 | 1950 | 7,125E-01 | 3450 | 4,961E-01 | 4950 | 9,066E-02 |
| 460 | | 8,835E-01 | 760 | < 1,000E-05 | 1060 | | 7,729E-05 | 2000 | 7,496E-01 | 3500 | 4,929E-01 | 5000 | 1,200E-01 |
| 470 | | 8,947E-01 | 770 | < 1,000E-05 | 1070 | | 1,000E-04 | 2050 | 7,815E-01 | 3550 | 4,948E-01 | 5050 | 1,486E-01 |
| 480 | | 9,029E-01 | 780 | < 1,000E-05 | 1080 | | 1,319E-04 | 2100 | 8,096E-01 | 3600 | 5,022E-01 | 5100 | 1,706E-01 |
| 490 | | 9,085E-01 | 790 | < 1,000E-05 | 1090 | | 1,712E-04 | 2150 | 8,319E-01 | 3650 | 5,144E-01 | 5150 | 1,811E-01 |

# Data Sheet

## BG66HS

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,913 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,71 |
| $\tau_i$ (514 nm) | | ≥ | 0,85 |
| $\tau_i$ (633 nm) | | ≥ | 0,04 |
| $\tau_i$ (694 nm) | | ≤ | 0,0025 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0004 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 365 nm to 1550 nm | | | |
| $B_1$ | | | 0,8063 |
| $B_2$ | | | 0,5354 |
| $B_3$ | | | 0,7669 |
| $C_1$ | | | 3,349E-03 µm² |
| $C_2$ | | | 1,7804E-02 µm² |
| $C_3$ | | | 131,310 µm² |
| **Internal quality** | | | |
| Bubble class | | | 2 |

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

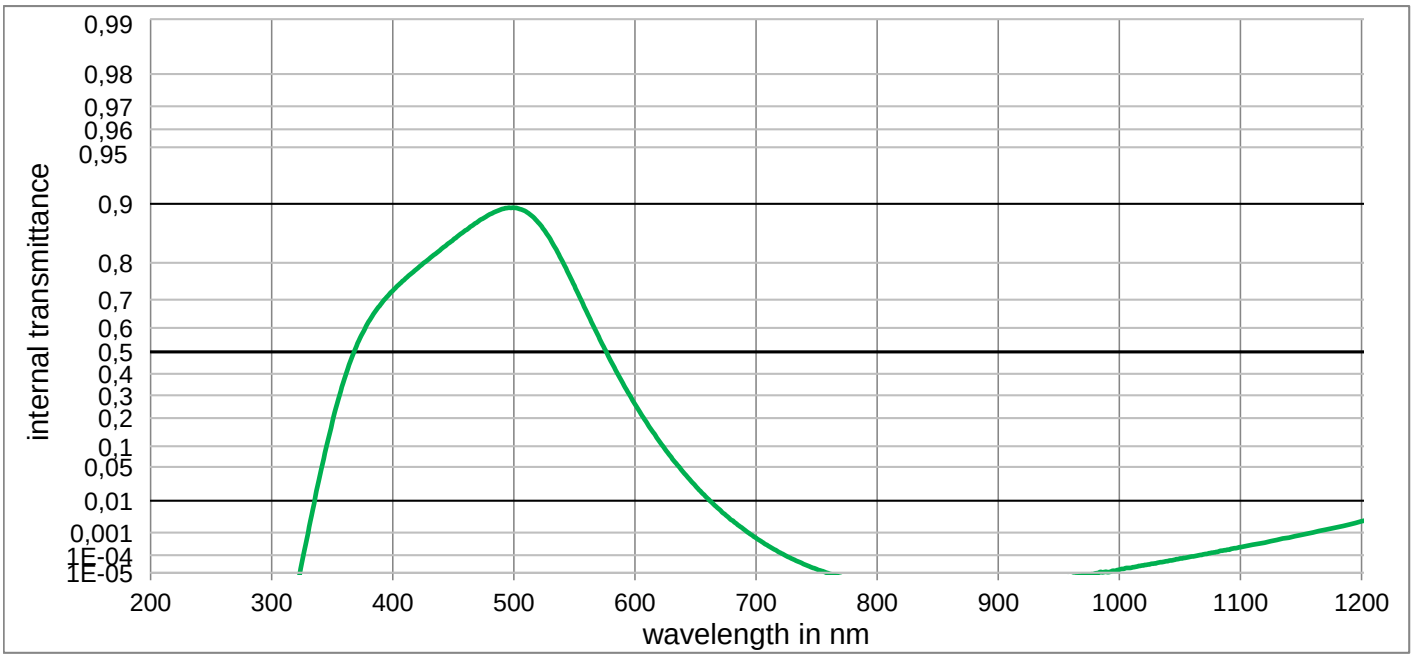
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 425 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 11,5 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,3 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 52,3 |
| | AR class | | |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,217 | 0,182 | 0,164 |
| | y | 0,313 | 0,298 | 0,288 |
| | Y | 56,0 | 40,9 | 31,9 |
| | $\lambda_d$ | 489 nm | 489 nm | 488 nm |
| | $P_e$ | 0,362 | 0,502 | 0,576 |
| Illuminant A | x | 0,300 | 0,234 | 0,198 |
| | y | 0,440 | 0,438 | 0,430 |
| | Y | 47,0 | 31,7 | 23,5 |
| | $\lambda_d$ | 499 nm | 497 nm | 496 nm |
| | $P_e$ | 0,338 | 0,495 | 0,581 |

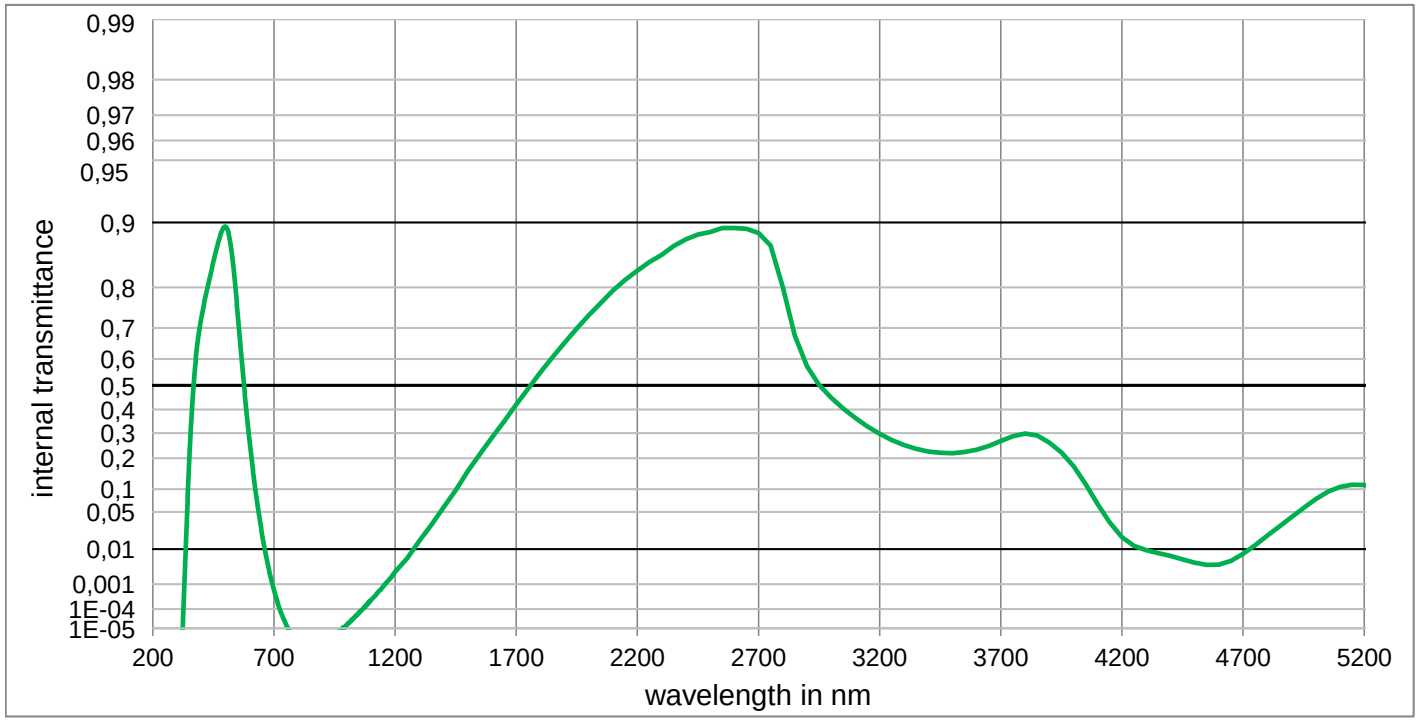
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.21mm) = 634 nm |
| DIN 58131 |

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



# Data Sheet

## BG66HS




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 8,950E-01 | 800 | < 1,000E-05 | 1100 | 2,451E-04 | 2200 | 8,318E-01 | 3700 | 2,668E-01 |
| 210 | < 1,0E-05 | 510 | 8,901E-01 | 810 | < 1,000E-05 | 1110 | 3,149E-04 | 2250 | 8,467E-01 | 3750 | 2,868E-01 |
| 220 | < 1,0E-05 | 520 | 8,752E-01 | 820 | < 1,000E-05 | 1120 | 3,900E-04 | 2300 | 8,577E-01 | 3800 | 2,981E-01 |
| 230 | < 1,0E-05 | 530 | 8,479E-01 | 830 | < 1,000E-05 | 1130 | 5,114E-04 | 2350 | 8,709E-01 | 3850 | 2,898E-01 |
| 240 | < 1,0E-05 | 540 | 8,039E-01 | 840 | < 1,000E-05 | 1140 | 6,304E-04 | 2400 | 8,798E-01 | 3900 | 2,617E-01 |
| 250 | < 1,0E-05 | 550 | 7,414E-01 | 850 | < 1,000E-05 | 1150 | 8,148E-04 | 2450 | 8,858E-01 | 3950 | 2,215E-01 |
| 260 | < 1,0E-05 | 560 | 6,603E-01 | 860 | < 1,000E-05 | 1160 | 1,017E-03 | 2500 | 8,891E-01 | 4000 | 1,714E-01 |
| 270 | < 1,0E-05 | 570 | 5,644E-01 | 870 | < 1,000E-05 | 1170 | 1,283E-03 | 2550 | 8,938E-01 | 4050 | 1,138E-01 |
| 280 | < 1,0E-05 | 580 | 4,600E-01 | 880 | < 1,000E-05 | 1180 | 1,561E-03 | 2600 | 8,939E-01 | 4100 | 6,435E-02 |
| 290 | < 1,0E-05 | 590 | 3,557E-01 | 890 | < 1,000E-05 | 1190 | 1,978E-03 | 2650 | 8,927E-01 | 4150 | 3,347E-02 |
| 300 | < 1,0E-05 | 600 | 2,598E-01 | 900 | < 1,000E-05 | 1200 | 2,514E-03 | 2700 | 8,877E-01 | 4200 | 1,817E-02 |
| 310 | < 1,0E-05 | 610 | 1,786E-01 | 910 | < 1,000E-05 | 1250 | 6,007E-03 | 2750 | 8,715E-01 | 4250 | 1,184E-02 |
| 320 | < 1,000E-05 | 620 | 1,154E-01 | 920 | < 1,000E-05 | 1300 | 1,525E-02 | 2800 | 8,004E-01 | 4300 | 9,431E-03 |
| 330 | 9,746E-04 | 630 | 7,064E-02 | 930 | < 1,000E-05 | 1350 | 3,121E-02 | 2850 | 6,770E-01 | 4350 | 8,061E-03 |
| 340 | 3,686E-02 | 640 | 4,057E-02 | 940 | < 1,000E-05 | 1400 | 5,831E-02 | 2900 | 5,736E-01 | 4400 | 6,827E-03 |
| 350 | 1,848E-01 | 650 | 2,192E-02 | 950 | < 1,000E-05 | 1450 | 9,706E-02 | 2950 | 5,020E-01 | 4450 | 5,629E-03 |
| 360 | 3,750E-01 | 660 | 1,135E-02 | 960 | < 1,000E-05 | 1500 | 1,543E-01 | 3000 | 4,490E-01 | 4500 | 4,562E-03 |
| 370 | 5,257E-01 | 670 | 5,713E-03 | 970 | < 1,000E-05 | 1550 | 2,162E-01 | 3050 | 4,039E-01 | 4550 | 3,951E-03 |
| 380 | 6,234E-01 | 680 | 2,706E-03 | 980 | < 1,000E-05 | 1600 | 2,816E-01 | 3100 | 3,635E-01 | 4600 | 4,022E-03 |
| 390 | 6,849E-01 | 690 | 1,310E-03 | 990 | 1,098E-05 | 1650 | 3,501E-01 | 3150 | 3,275E-01 | 4650 | 5,088E-03 |
| 400 | 7,276E-01 | 700 | 6,095E-04 | 1000 | 1,558E-05 | 1700 | 4,212E-01 | 3200 | 2,968E-01 | 4700 | 7,678E-03 |
| 410 | 7,600E-01 | 710 | 2,798E-04 | 1010 | 2,078E-05 | 1750 | 4,883E-01 | 3250 | 2,714E-01 | 4750 | 1,229E-02 |
| 420 | 7,860E-01 | 720 | 1,318E-04 | 1020 | 2,785E-05 | 1800 | 5,511E-01 | 3300 | 2,513E-01 | 4800 | 1,932E-02 |
| 430 | 8,087E-01 | 730 | 6,345E-05 | 1030 | 3,659E-05 | 1850 | 6,065E-01 | 3350 | 2,363E-01 | 4850 | 2,904E-02 |
| 440 | 8,292E-01 | 740 | 3,181E-05 | 1040 | 4,852E-05 | 1900 | 6,553E-01 | 3400 | 2,259E-01 | 4900 | 4,150E-02 |
| 450 | 8,471E-01 | 750 | 1,671E-05 | 1050 | 6,733E-05 | 1950 | 6,989E-01 | 3450 | 2,202E-01 | 4950 | 5,726E-02 |
| 460 | 8,626E-01 | 760 | < 1,000E-05 | 1060 | 8,545E-05 | 2000 | 7,349E-01 | 3500 | 2,192E-01 | 5000 | 7,547E-02 |
| 470 | 8,758E-01 | 770 | < 1,000E-05 | 1070 | 1,127E-04 | 2050 | 7,661E-01 | 3550 | 2,233E-01 | 5050 | 9,314E-02 |
| 480 | 8,864E-01 | 780 | < 1,000E-05 | 1080 | 1,454E-04 | 2100 | 7,934E-01 | 3600 | 2,327E-01 | 5100 | 1,062E-01 |
| 490 | 8,933E-01 | 790 | < 1,000E-05 | 1090 | 1,854E-04 | 2150 | 8,150E-01 | 3650 | 2,474E-01 | 5150 | 1,124E-01 |

# Data Sheet

## BG67

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,913 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (450 nm) | ≥ | 0,7 | |
| $\tau_i$ (500 nm) | ≥ | 0,8 | |
| $\tau_i$ (550 nm) | ≥ | 0,65 | |
| $\tau_i$ (600 nm) | ≤ | 0,19 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,55 | |
| $n_e$ (546 nm) | = | 1,54 | |
| $n_d$ (587,6 nm) | = | 1,54 | |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | | 0,7165 | |
| $B_2$ | | 0,6218 | |
| $B_3$ | | 0,6042 | |
| $C_1$ | | 1,764E-09 | µm² |
| $C_2$ | | 1,9422E-02 | µm² |
| $C_3$ | | 100,000 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

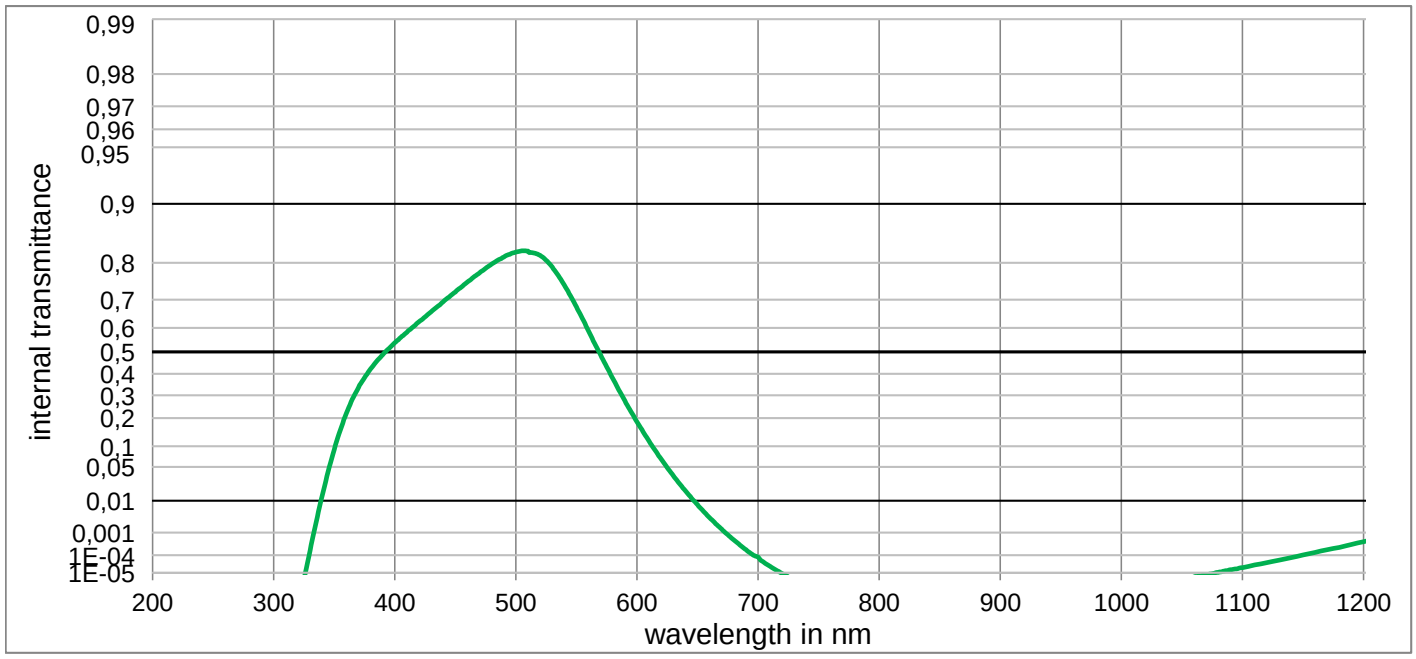
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 1,00 mm |
| **Density** | | |
| ρ | = | 2,85 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | = | 364 |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 52.3 |
| AR class | = | 3.3 |
| **Resistance against humidity** | | |
| Robust glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

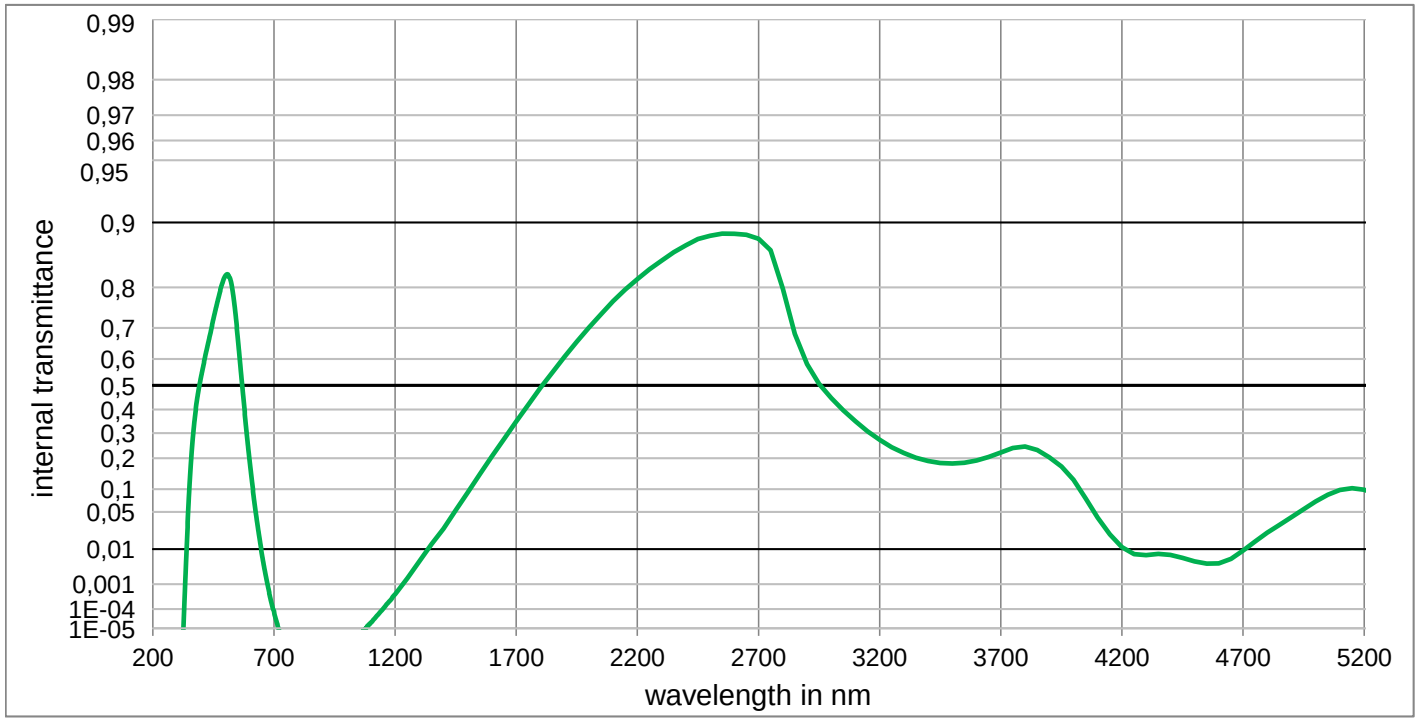
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,209 | 0,176 | 0,159 |
| | y | 0,321 | 0,317 | 0,318 |
| | Y | 49,7 | 33,4 | 24,0 |
| | $\lambda_d$ | 491 nm | 490 nm | 491 nm |
| | $P_e$ | 0,383 | 0,508 | 0,569 |
| Illuminant A | x | 0,285 | 0,222 | 0,189 |
| | y | 0,450 | 0,456 | 0,457 |
| | Y | 40,9 | 25,4 | 17,5 |
| | $\lambda_d$ | 499 nm | 498 nm | 498 nm |
| | $P_e$ | 0,372 | 0,519 | 0,595 |

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.145mm) @ 641 nm |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## BG67




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 8,231E-01 | 800 | < 1,000E-05 | 1100 | 2,071E-05 | 2200 | 8,164E-01 | 3700 | 2,218E-01 |
| 210 | < 1,0E-05 | 510 | 8,251E-01 | 810 | < 1,000E-05 | 1110 | 2,923E-05 | 2250 | 8,345E-01 | 3750 | 2,392E-01 |
| 220 | < 1,0E-05 | 520 | 8,162E-01 | 820 | < 1,000E-05 | 1120 | 3,952E-05 | 2300 | 8,488E-01 | 3800 | 2,455E-01 |
| 230 | < 1,0E-05 | 530 | 7,899E-01 | 830 | < 1,000E-05 | 1130 | 5,505E-05 | 2350 | 8,619E-01 | 3850 | 2,318E-01 |
| 240 | < 1,0E-05 | 540 | 7,437E-01 | 840 | < 1,000E-05 | 1140 | 7,511E-05 | 2400 | 8,717E-01 | 3900 | 2,036E-01 |
| 250 | < 1,0E-05 | 550 | 6,764E-01 | 850 | < 1,000E-05 | 1150 | 1,020E-04 | 2450 | 8,803E-01 | 3950 | 1,699E-01 |
| 260 | < 1,0E-05 | 560 | 5,876E-01 | 860 | < 1,000E-05 | 1160 | 1,362E-04 | 2500 | 8,844E-01 | 4000 | 1,268E-01 |
| 270 | < 1,0E-05 | 570 | 4,859E-01 | 870 | < 1,000E-05 | 1170 | 1,856E-04 | 2550 | 8,871E-01 | 4050 | 7,709E-02 |
| 280 | < 1,0E-05 | 580 | 3,787E-01 | 880 | < 1,000E-05 | 1180 | 2,399E-04 | 2600 | 8,867E-01 | 4100 | 4,066E-02 |
| 290 | < 1,0E-05 | 590 | 2,747E-01 | 890 | < 1,000E-05 | 1190 | 3,271E-04 | 2650 | 8,855E-01 | 4150 | 2,051E-02 |
| 300 | < 1,0E-05 | 600 | 1,851E-01 | 900 | < 1,000E-05 | 1200 | 4,258E-04 | 2700 | 8,805E-01 | 4200 | 1,109E-02 |
| 310 | < 1,0E-05 | 610 | 1,152E-01 | 910 | < 1,000E-05 | 1250 | 1,575E-03 | 2750 | 8,647E-01 | 4250 | 7,611E-03 |
| 320 | < 1,000E-05 | 620 | 6,630E-02 | 920 | < 1,000E-05 | 1300 | 4,935E-03 | 2800 | 7,974E-01 | 4300 | 7,207E-03 |
| 330 | 1,702E-04 | 630 | 3,513E-02 | 930 | < 1,000E-05 | 1350 | 1,287E-02 | 2850 | 6,825E-01 | 4350 | 7,703E-03 |
| 340 | 1,300E-02 | 640 | 1,721E-02 | 940 | < 1,000E-05 | 1400 | 2,625E-02 | 2900 | 5,817E-01 | 4400 | 7,300E-03 |
| 350 | 9,108E-02 | 650 | 7,798E-03 | 950 | < 1,000E-05 | 1450 | 5,320E-02 | 2950 | 5,066E-01 | 4450 | 6,119E-03 |
| 360 | 2,195E-01 | 660 | 3,302E-03 | 960 | < 1,000E-05 | 1500 | 9,161E-02 | 3000 | 4,476E-01 | 4500 | 4,921E-03 |
| 370 | 3,360E-01 | 670 | 1,321E-03 | 970 | < 1,000E-05 | 1550 | 1,447E-01 | 3050 | 3,964E-01 | 4550 | 4,292E-03 |
| 380 | 4,226E-01 | 680 | 5,023E-04 | 980 | < 1,000E-05 | 1600 | 2,069E-01 | 3100 | 3,497E-01 | 4600 | 4,391E-03 |
| 390 | 4,878E-01 | 690 | 1,842E-04 | 990 | < 1,000E-05 | 1650 | 2,769E-01 | 3150 | 3,079E-01 | 4650 | 5,777E-03 |
| 400 | 5,392E-01 | 700 | 8,097E-05 | 1000 | < 1,000E-05 | 1700 | 3,488E-01 | 3200 | 2,721E-01 | 4700 | 9,208E-03 |
| 410 | 5,833E-01 | 710 | 2,428E-05 | 1010 | < 1,000E-05 | 1750 | 4,211E-01 | 3250 | 2,426E-01 | 4750 | 1,479E-02 |
| 420 | 6,234E-01 | 720 | < 1,000E-05 | 1020 | < 1,000E-05 | 1800 | 4,898E-01 | 3300 | 2,195E-01 | 4800 | 2,212E-02 |
| 430 | 6,594E-01 | 730 | < 1,000E-05 | 1030 | < 1,000E-05 | 1850 | 5,517E-01 | 3350 | 2,018E-01 | 4850 | 3,079E-02 |
| 440 | 6,935E-01 | 740 | < 1,000E-05 | 1040 | < 1,000E-05 | 1900 | 6,083E-01 | 3400 | 1,895E-01 | 4900 | 4,149E-02 |
| 450 | 7,239E-01 | 750 | < 1,000E-05 | 1050 | < 1,000E-05 | 1950 | 6,584E-01 | 3450 | 1,825E-01 | 4950 | 5,501E-02 |
| 460 | 7,523E-01 | 760 | < 1,000E-05 | 1060 | < 1,000E-05 | 2000 | 7,010E-01 | 3500 | 1,804E-01 | 5000 | 7,058E-02 |
| 470 | 7,760E-01 | 770 | < 1,000E-05 | 1070 | < 1,000E-05 | 2050 | 7,377E-01 | 3550 | 1,834E-01 | 5050 | 8,601E-02 |
| 480 | 7,970E-01 | 780 | < 1,000E-05 | 1080 | 1,035E-05 | 2100 | 7,696E-01 | 3600 | 1,913E-01 | 5100 | 9,768E-02 |
| 490 | 8,128E-01 | 790 | < 1,000E-05 | 1090 | 1,536E-05 | 2150 | 7,959E-01 | 3650 | 2,044E-01 | 5150 | 1,023E-01 |

# Data Sheet

## BG67HT

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,913 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (450 nm) | | ≥ | 0,75 |
| $\tau_i$ (500 nm) | | ≥ | 0,83 |
| $\tau_i$ (550 nm) | | ≥ | 0,65 |
| $\tau_i$ (600 nm) | | ≤ | 0,19 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | 0,7165 | | |
| $B_2$ | 0,6218 | | |
| $B_3$ | 0,6042 | | |
| $C_1$ | 1,764E-09 | µm² | |
| $C_2$ | 1,9422E-02 | µm² | |
| $C_3$ | 100,000 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

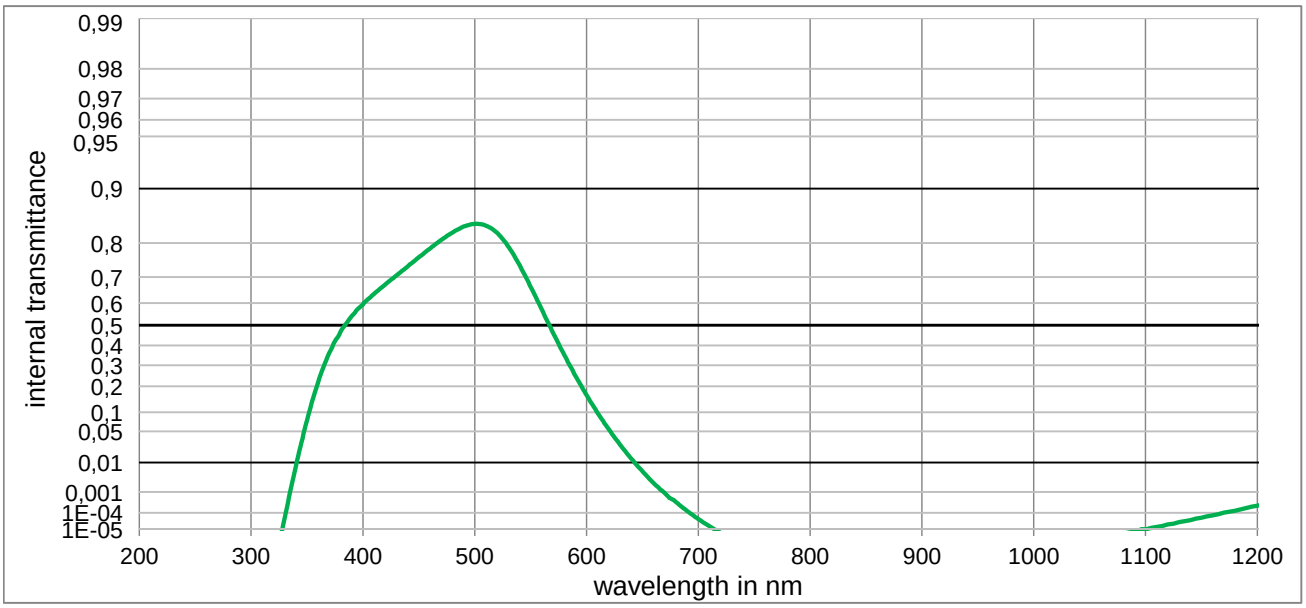
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 390 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 11,8 |
| $\alpha_{(20°C/300°C)}$ | | = | 13,7 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.3 |
| | AR class | = | 3.3 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,203 | 0,170 | 0,154 |
| | y | 0,312 | 0,300 | 0,294 |
| | Y | 49,0 | 33,2 | 24,1 |
| | $\lambda_d$ | 490 nm | 489 nm | 489 nm |
| | $P_e$ | 0,413 | 0,543 | 0,607 |
| Illuminant A | x | 0,274 | 0,211 | 0,179 |
| | y | 0,445 | 0,441 | 0,434 |
| | Y | 39,9 | 24,9 | 17,2 |
| | $\lambda_d$ | 499 nm | 497 nm | 496 nm |
| | $P_e$ | 0,398 | 0,549 | 0,625 |

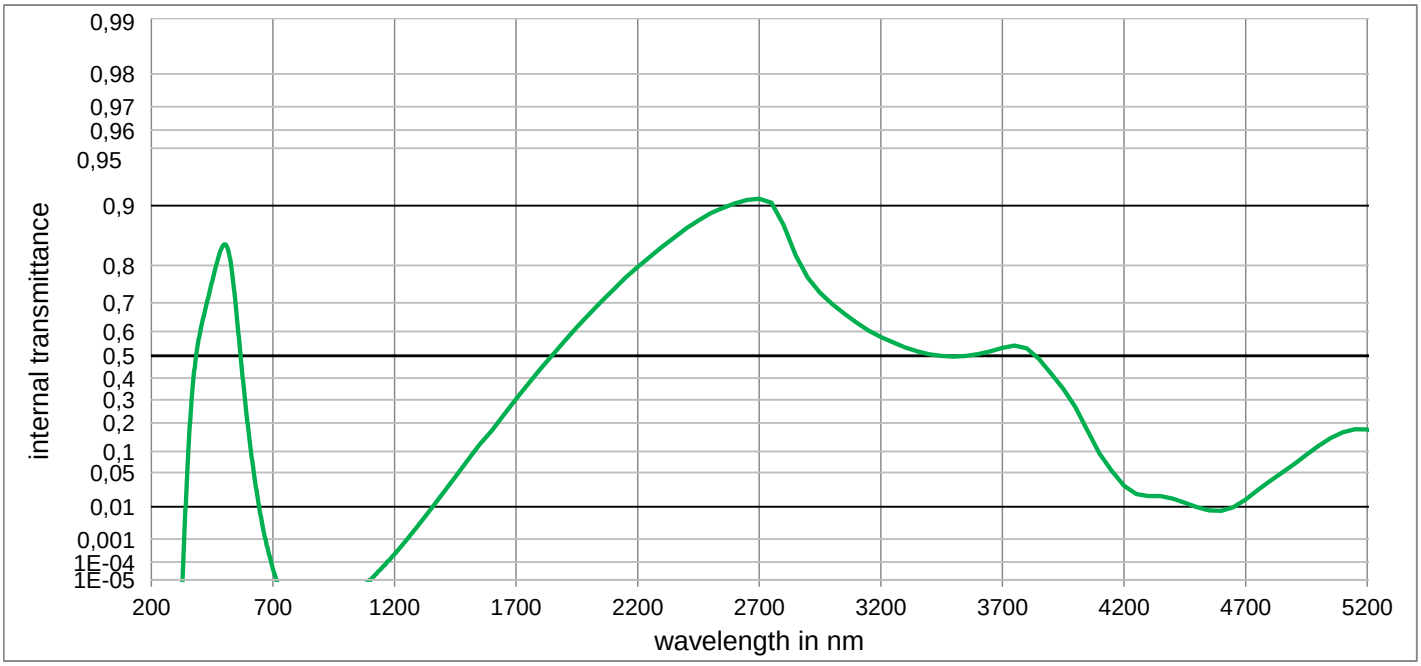
| Notes |
|---|
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.11mm) @ 634 nm |
| DIN 58131 |

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



# Data Sheet

## BG67HT




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 8,425E-01 | 800 | < 1,000E-05 | 1100 | < 1,000E-05 | 2200 | 7,964E-01 | 3700 | 5,342E-01 |
| 210 | < 1,0E-05 | 510 | 8,389E-01 | 810 | < 1,000E-05 | 1110 | 1,392E-05 | 2250 | 8,185E-01 | 3750 | 5,437E-01 |
| 220 | < 1,0E-05 | 520 | 8,236E-01 | 820 | < 1,000E-05 | 1120 | 1,999E-05 | 2300 | 8,379E-01 | 3800 | 5,316E-01 |
| 230 | < 1,0E-05 | 530 | 7,914E-01 | 830 | < 1,000E-05 | 1130 | 2,837E-05 | 2350 | 8,541E-01 | 3850 | 4,866E-01 |
| 240 | < 1,0E-05 | 540 | 7,393E-01 | 840 | < 1,000E-05 | 1140 | 3,755E-05 | 2400 | 8,694E-01 | 3900 | 4,207E-01 |
| 250 | < 1,0E-05 | 550 | 6,655E-01 | 850 | < 1,000E-05 | 1150 | 5,176E-05 | 2450 | 8,808E-01 | 3950 | 3,509E-01 |
| 260 | < 1,0E-05 | 560 | 5,721E-01 | 860 | < 1,000E-05 | 1160 | 7,067E-05 | 2500 | 8,905E-01 | 4000 | 2,676E-01 |
| 270 | < 1,0E-05 | 570 | 4,641E-01 | 870 | < 1,000E-05 | 1170 | 1,026E-04 | 2550 | 8,973E-01 | 4050 | 1,689E-01 |
| 280 | < 1,0E-05 | 580 | 3,534E-01 | 880 | < 1,000E-05 | 1180 | 1,293E-04 | 2600 | 9,027E-01 | 4100 | 9,411E-02 |
| 290 | < 1,0E-05 | 590 | 2,493E-01 | 890 | < 1,000E-05 | 1190 | 1,808E-04 | 2650 | 9,067E-01 | 4150 | 5,303E-02 |
| 300 | < 1,0E-05 | 600 | 1,627E-01 | 900 | < 1,000E-05 | 1200 | 2,372E-04 | 2700 | 9,079E-01 | 4200 | 2,924E-02 |
| 310 | < 1,0E-05 | 610 | 9,760E-02 | 910 | < 1,000E-05 | 1250 | 9,582E-04 | 2750 | 9,034E-01 | 4250 | 1,970E-02 |
| 320 | < 1,000E-05 | 620 | 5,393E-02 | 920 | < 1,000E-05 | 1300 | 3,153E-03 | 2800 | 8,741E-01 | 4300 | 1,772E-02 |
| 330 | 4,871E-05 | 630 | 2,735E-02 | 930 | < 1,000E-05 | 1350 | 8,739E-03 | 2850 | 8,210E-01 | 4350 | 1,772E-02 |
| 340 | 7,922E-03 | 640 | 1,274E-02 | 940 | < 1,000E-05 | 1400 | 2,078E-02 | 2900 | 7,707E-01 | 4400 | 1,571E-02 |
| 350 | 7,618E-02 | 650 | 5,556E-03 | 950 | < 1,000E-05 | 1450 | 4,231E-02 | 2950 | 7,303E-01 | 4450 | 1,258E-02 |
| 360 | 2,203E-01 | 660 | 2,205E-03 | 960 | < 1,000E-05 | 1500 | 7,563E-02 | 3000 | 6,961E-01 | 4500 | 9,730E-03 |
| 370 | 3,634E-01 | 670 | 8,986E-04 | 970 | < 1,000E-05 | 1550 | 1,217E-01 | 3050 | 6,643E-01 | 4550 | 8,055E-03 |
| 380 | 4,698E-01 | 680 | 3,566E-04 | 980 | < 1,000E-05 | 1600 | 1,704E-01 | 3100 | 6,331E-01 | 4600 | 7,823E-03 |
| 390 | 5,425E-01 | 690 | 1,258E-04 | 990 | < 1,000E-05 | 1650 | 2,347E-01 | 3150 | 6,032E-01 | 4650 | 9,759E-03 |
| 400 | 5,941E-01 | 700 | 4,383E-05 | 1000 | < 1,000E-05 | 1700 | 3,036E-01 | 3200 | 5,784E-01 | 4700 | 1,497E-02 |
| 410 | 6,380E-01 | 710 | 1,529E-05 | 1010 | < 1,000E-05 | 1750 | 3,737E-01 | 3250 | 5,564E-01 | 4750 | 2,385E-02 |
| 420 | 6,736E-01 | 720 | < 1,000E-05 | 1020 | < 1,000E-05 | 1800 | 4,423E-01 | 3300 | 5,361E-01 | 4800 | 3,556E-02 |
| 430 | 7,056E-01 | 730 | < 1,000E-05 | 1030 | < 1,000E-05 | 1850 | 5,043E-01 | 3350 | 5,195E-01 | 4850 | 4,991E-02 |
| 440 | 7,350E-01 | 740 | < 1,000E-05 | 1040 | < 1,000E-05 | 1900 | 5,627E-01 | 3400 | 5,065E-01 | 4900 | 6,777E-02 |
| 450 | 7,620E-01 | 750 | < 1,000E-05 | 1050 | < 1,000E-05 | 1950 | 6,167E-01 | 3450 | 4,991E-01 | 4950 | 9,057E-02 |
| 460 | 7,861E-01 | 760 | < 1,000E-05 | 1060 | < 1,000E-05 | 2000 | 6,627E-01 | 3500 | 4,961E-01 | 5000 | 1,170E-01 |
| 470 | 8,074E-01 | 770 | < 1,000E-05 | 1070 | < 1,000E-05 | 2050 | 7,040E-01 | 3550 | 4,998E-01 | 5050 | 1,430E-01 |
| 480 | 8,244E-01 | 780 | < 1,000E-05 | 1080 | < 1,000E-05 | 2100 | 7,389E-01 | 3600 | 5,074E-01 | 5100 | 1,638E-01 |
| 490 | 8,370E-01 | 790 | < 1,000E-05 | 1090 | < 1,000E-05 | 2150 | 7,711E-01 | 3650 | 5,196E-01 | 5150 | 1,750E-01 |

# Data Sheet

## S8022

### Optical properties

**Reflection factor**

$P_d$ = 0,910

**Values guaranteed**

The color of glass is within a circle of
the CIE Yu'v'UCS(1976) defined by

$(u' - 0{,}088)^2 + (v' - 0{,}543)^2 = (0{,}037)^2$

for any black body radiator 1500K to 3200K

| Black body radiator | Photopic Transmittance [%] |
|---|---|
| 2100 K | 13,5 ±1.5 |
| 1500 K | 9 ±1.5 |

**Refractive indices**

| | | |
|---|---|---|
| $n_e$ (546 nm) | = | 1,56 |
| $n_d$ (587,6 nm) | = | 1,555 ± 0,005 |

**Sellmeier coefficients**

valid from 440 nm to 1550 nm

| | |
|---|---|
| | 1,0783 |
| | 0,3094 |
| | 36,9992 |
| | 5,301E-09 µm² |
| | 3,8950E-02 µm² |
| | 5395,591 µm² |

**Internal quality**

Bubble class 1

### Mechanical properties

**Reference thickness**

d = 2 mm

**Density**

ρ = 2,77 g/cm³

**Knoop hardness**

HK[0.1/20]

### Thermal properties

**Transformation temperature**

Tg = 453 °C

**Thermal expansion in** $10^{-6}$/K

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

### Chemical properties

**Chemical resistance**

| | | |
|---|---|---|
| FR class | = | 0 |
| SR class | = | 4 |
| AR class | = | 3 |

**Resistance against humidity**

Delicate glass

see pocket catalogue "Optical Filter Glass 2020", chapter 5.5

### Colormetric properties

| | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | 0,196 | 0,169 | 0,154 |
| | y | 0,374 | 0,432 | 0,492 |
| | Y | 37,3 | 20,7 | 12,4 |
| | $\lambda_d$ | 496,0 | 500,0 | 505,0 |
| | $P_e$ | 0,400 | 0,470 | 0,510 |
| Illuminant A | x | 0,253 | 0,203 | 0,178 |
| | y | 0,498 | 0,549 | 0,593 |
| | Y | 29,6 | 15,5 | 9,0 |
| | $\lambda_d$ | 503,0 | 505,0 | 508,0 |
| | $P_e$ | 0,440 | 0,550 | 0,610 |

### Notes

Ionically colored glass

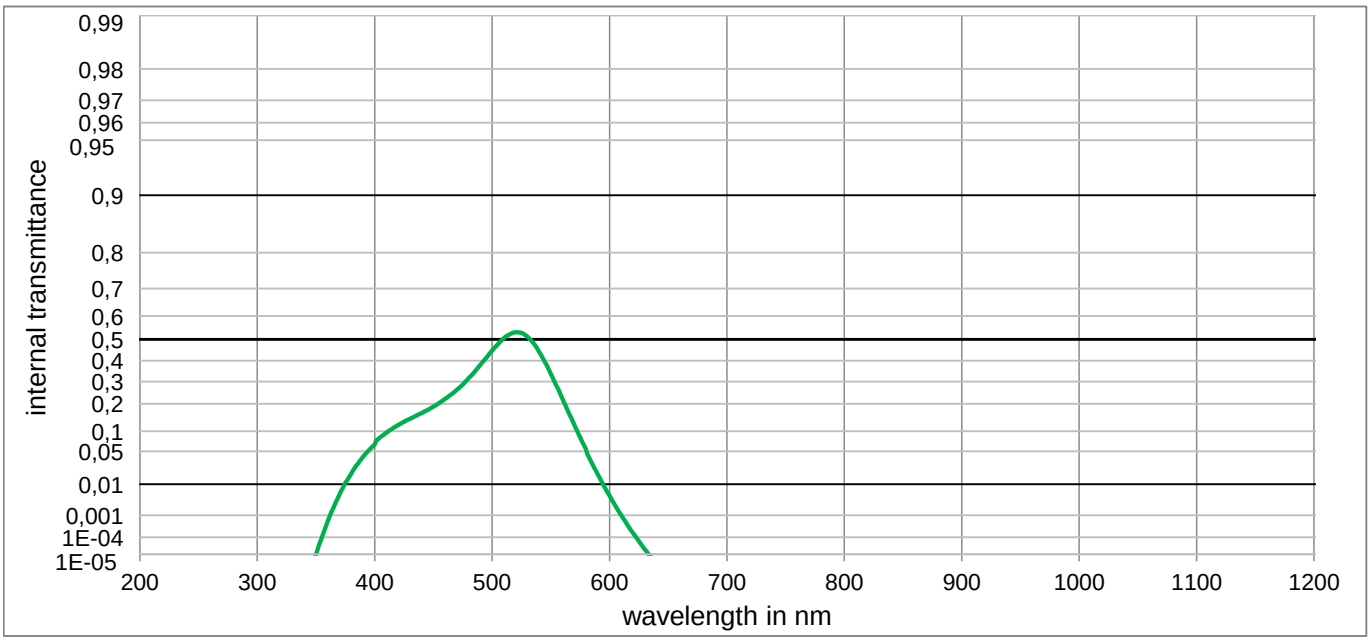
Bandpass filter

NIR cutoff filter

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

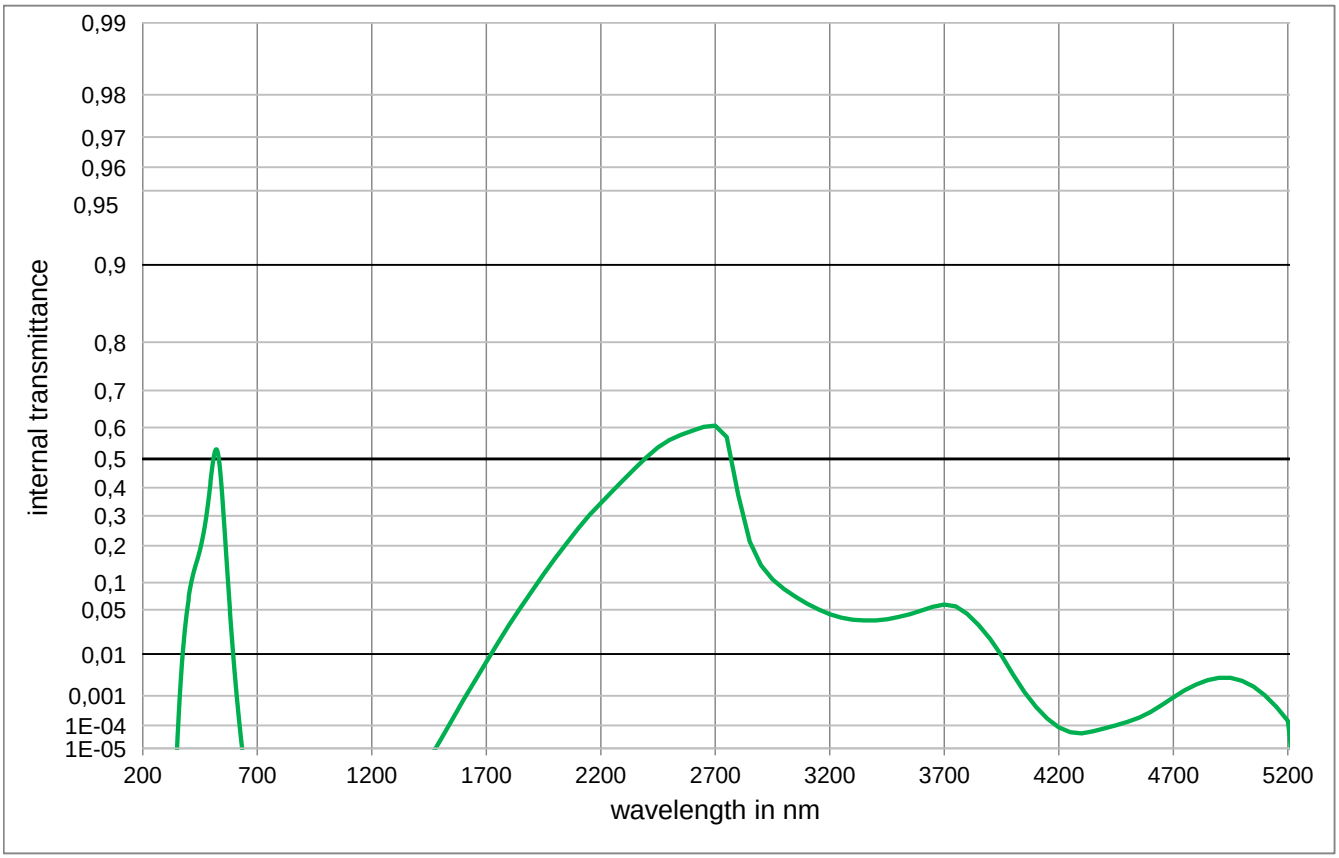
### Disclaimer

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



# Data Sheet

## S8022

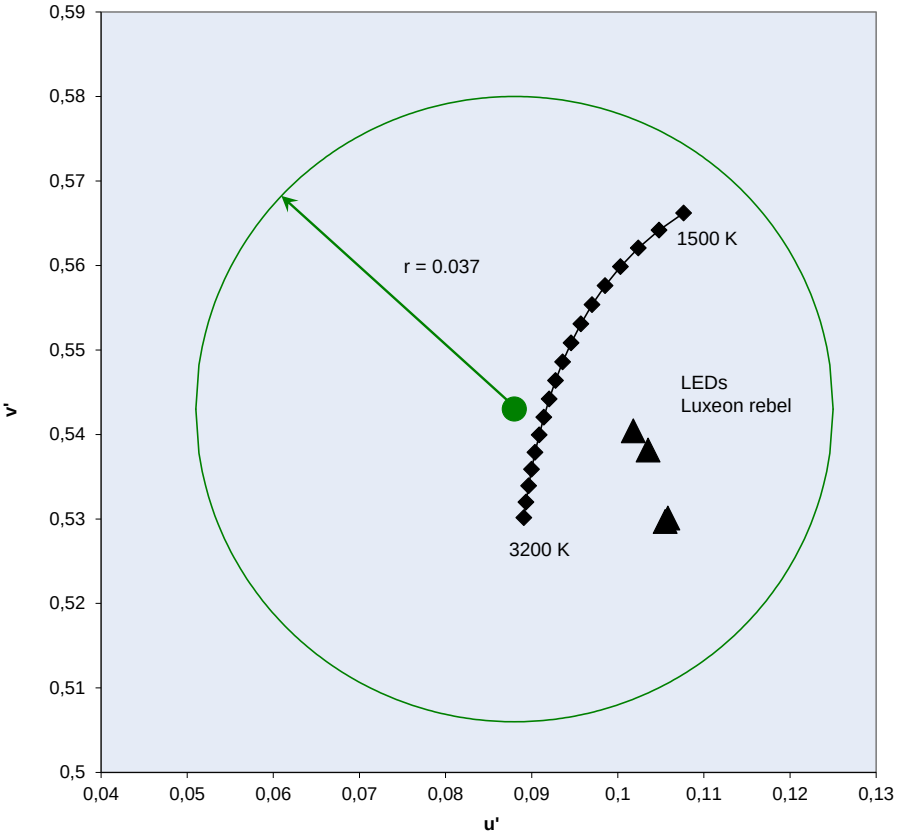



**Internal transmittance ti at reference thickness**

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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 4,483E-01 | 800 | < 1,000E-05 | 1100 | < 1,000E-05 | 2200 | 3,453E-01 | 3700 | 5,800E-02 |
| 210 | < 1,0E-05 | 510 | 5,049E-01 | 810 | < 1,000E-05 | 1110 | < 1,000E-05 | 2250 | 3,871E-01 | 3750 | 5,505E-02 |
| 220 | < 1,0E-05 | 520 | 5,313E-01 | 820 | < 1,000E-05 | 1120 | < 1,000E-05 | 2300 | 4,287E-01 | 3800 | 4,448E-02 |
| 230 | < 1,0E-05 | 530 | 5,123E-01 | 830 | < 1,000E-05 | 1130 | < 1,000E-05 | 2350 | 4,691E-01 | 3850 | 3,093E-02 |
| 240 | < 1,0E-05 | 540 | 4,431E-01 | 840 | < 1,000E-05 | 1140 | < 1,000E-05 | 2400 | 5,060E-01 | 3900 | 1,879E-02 |
| 250 | < 1,0E-05 | 550 | 3,370E-01 | 850 | < 1,000E-05 | 1150 | < 1,000E-05 | 2450 | 5,380E-01 | 3950 | 9,286E-03 |
| 260 | < 1,0E-05 | 560 | 2,201E-01 | 860 | < 1,000E-05 | 1160 | < 1,000E-05 | 2500 | 5,617E-01 | 4000 | 3,658E-03 |
| 270 | < 1,0E-05 | 570 | 1,199E-01 | 870 | < 1,000E-05 | 1170 | < 1,000E-05 | 2550 | 5,775E-01 | 4050 | 1,282E-03 |
| 280 | < 1,0E-05 | 580 | 5,327E-02 | 880 | < 1,000E-05 | 1180 | < 1,000E-05 | 2600 | 5,903E-01 | 4100 | 4,598E-04 |
| 290 | < 1,0E-05 | 590 | 1,731E-02 | 890 | < 1,000E-05 | 1190 | < 1,000E-05 | 2650 | 6,017E-01 | 4150 | 1,798E-04 |
| 300 | < 1,0E-05 | 600 | 4,677E-03 | 900 | < 1,000E-05 | 1200 | < 1,000E-05 | 2700 | 6,055E-01 | 4200 | 8,400E-05 |
| 310 | < 1,0E-05 | 610 | 9,895E-04 | 910 | < 1,000E-05 | 1250 | < 1,000E-05 | 2750 | 5,709E-01 | 4250 | 5,361E-05 |
| 320 | < 1,000E-05 | 620 | 1,628E-04 | 920 | < 1,000E-05 | 1300 | < 1,000E-05 | 2800 | 3,741E-01 | 4300 | 4,785E-05 |
| 330 | < 1,000E-05 | 630 | 2,102E-05 | 930 | < 1,000E-05 | 1350 | < 1,000E-05 | 2850 | 2,130E-01 | 4350 | 5,774E-05 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | < 1,000E-05 | 1400 | < 1,000E-05 | 2900 | 1,425E-01 | 4400 | 7,778E-05 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | < 1,000E-05 | 1450 | < 1,000E-05 | 2950 | 1,074E-01 | 4450 | 1,016E-04 |
| 360 | 5,717E-04 | 660 | < 1,000E-05 | 960 | < 1,000E-05 | 1500 | 2,437E-05 | 3000 | 8,629E-02 | 4500 | 1,365E-04 |
| 370 | 5,212E-03 | 670 | < 1,000E-05 | 970 | < 1,000E-05 | 1550 | 1,610E-04 | 3050 | 7,123E-02 | 4550 | 1,958E-04 |
| 380 | 1,815E-02 | 680 | < 1,000E-05 | 980 | < 1,000E-05 | 1600 | 7,352E-04 | 3100 | 5,950E-02 | 4600 | 3,023E-04 |
| 390 | 3,992E-02 | 690 | < 1,000E-05 | 990 | < 1,000E-05 | 1650 | 2,520E-03 | 3150 | 5,038E-02 | 4650 | 5,195E-04 |
| 400 | 6,468E-02 | 700 | < 1,000E-05 | 1000 | < 1,000E-05 | 1700 | 6,915E-03 | 3200 | 4,380E-02 | 4700 | 9,015E-04 |
| 410 | 9,600E-02 | 710 | < 1,000E-05 | 1010 | < 1,000E-05 | 1750 | 1,600E-02 | 3250 | 3,942E-02 | 4750 | 1,433E-03 |
| 420 | 1,198E-01 | 720 | < 1,000E-05 | 1020 | < 1,000E-05 | 1800 | 3,121E-02 | 3300 | 3,689E-02 | 4800 | 2,044E-03 |
| 430 | 1,414E-01 | 730 | < 1,000E-05 | 1030 | < 1,000E-05 | 1850 | 5,323E-02 | 3350 | 3,594E-02 | 4850 | 2,635E-03 |
| 440 | 1,629E-01 | 740 | < 1,000E-05 | 1040 | < 1,000E-05 | 1900 | 8,298E-02 | 3400 | 3,609E-02 | 4900 | 3,028E-03 |
| 450 | 1,883E-01 | 750 | < 1,000E-05 | 1050 | < 1,000E-05 | 1950 | 1,197E-01 | 3450 | 3,746E-02 | 4950 | 3,019E-03 |
| 460 | 2,211E-01 | 760 | < 1,000E-05 | 1060 | < 1,000E-05 | 2000 | 1,616E-01 | 3500 | 4,005E-02 | 5000 | 2,545E-03 |
| 470 | 2,620E-01 | 770 | < 1,000E-05 | 1070 | < 1,000E-05 | 2050 | 2,074E-01 | 3550 | 4,379E-02 | 5050 | 1,799E-03 |
| 480 | 3,155E-01 | 780 | < 1,000E-05 | 1080 | < 1,000E-05 | 2100 | 2,550E-01 | 3600 | 4,878E-02 | 5100 | 1,030E-03 |
| 490 | 3,799E-01 | 790 | < 1,000E-05 | 1090 | < 1,000E-05 | 2150 | 3,025E-01 | 3650 | 5,436E-02 | 5150 | 4,597E-04 |

**Chromaticity dependence on Incandescent Color Temperature**




| Chromaticity and NVIS Radiance at reference thickness 2 mm | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Planck [K]** | **u'** | **v'** | **x** | **y** | **Y** | **$NR_A$** | **NVIS Green A** |
| 1500 | 0,108 | 0,566 | 0,270 | 0,631 | 9,5 | 6,1E-11 | |
| 1600 | 0,105 | 0,564 | 0,262 | 0,627 | 10,4 | 5,8E-11 | **NVIS Green A Chromaticity coodinates** |
| 1700 | 0,102 | 0,562 | 0,254 | 0,621 | 11,2 | 5,6E-11 | **(as defined by MIL-STD-3009)** |
| 1800 | 0,100 | 0,560 | 0,248 | 0,615 | 11,9 | 5,4E-11 | |
| 1900 | 0,099 | 0,558 | 0,242 | 0,608 | 12,6 | 5,2E-11 | **u' = 0.088** |
| 2000 | 0,097 | 0,555 | 0,236 | 0,601 | 13,3 | 5,1E-11 | **v' = 0.543** |
| 2100 | 0,096 | 0,553 | 0,231 | 0,594 | 13,9 | 5,0E-11 | |
| 2200 | 0,095 | 0,551 | 0,227 | 0,587 | 14,5 | 4,9E-11 | **with radius of tolerance r = 0.037** |
| 2300 | 0,094 | 0,549 | 0,223 | 0,580 | 15,0 | 4,8E-11 | |
| 2400 | 0,093 | 0,546 | 0,219 | 0,573 | 15,5 | 4,7E-11 | |
| 2500 | 0,092 | 0,544 | 0,215 | 0,566 | 15,9 | 4,7E-11 | |
| 2600 | 0,091 | 0,542 | 0,212 | 0,559 | 16,3 | 4,6E-11 | |
| 2700 | 0,091 | 0,540 | 0,209 | 0,553 | 16,7 | 4,6E-11 | |
| 2800 | 0,090 | 0,538 | 0,207 | 0,547 | 17,1 | 4,5E-11 | |
| 2900 | 0,090 | 0,536 | 0,204 | 0,540 | 17,4 | 4,5E-11 | |
| 3000 | 0,090 | 0,534 | 0,202 | 0,535 | 17,8 | 4,4E-11 | |
| 3100 | 0,089 | 0,532 | 0,200 | 0,529 | 18,1 | 4,4E-11 | |
| 3200 | 0,089 | 0,530 | 0,198 | 0,523 | 18,4 | 4,4E-11 | |
| **LED** | **u'** | **v'** | **x** | **y** | **Y** | **$NR_A$** | |
| LUXEON rebel A2-RM-G | 0,102 | 0,540 | 0,231 | 0,545 | 21,1 | 4,2E-11 | |
| LUXEON rebel T2-SO-L | 0,106 | 0,530 | 0,229 | 0,511 | 20,9 | 4,2E-11 | |
| LUXEON rebel B5-R0-G | 0,106 | 0,530 | 0,228 | 0,510 | 20,7 | 4,3E-11 | |
| LUXEON rebel Q1-RM-K | 0,104 | 0,538 | 0,232 | 0,537 | 20,7 | 4,3E-11 | |
| **other sources of illumination** | A service for calculating chromaticity or NVIS radiance can be provided | | | | | | |

# Data Sheet

## S8023

### Optical properties

**Reflection factor**

$P_d$ = 0,913

**Values guaranteed**

The color of the glass is within a circle of the CIE Y u' v' UCS(1976) defined by

$(u' - 0{,}088)^2 + (v' - 0{,}543)^2 = (0{,}037)^2$

for any black body radiator 1500K to 3200K

| Black body radiator | Photopic Transmittance [%] |
|---|---|
| 2100 K | 15,0 ±1,5 |
| 1500 K | 10,0 ±1,5 |

**Refractive indices**

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

**Sellmeier coefficients**

valid from 440 nm to 1550 nm

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

**Internal quality**

Bubble class 1

### Mechanical properties

**Reference thickness**

d = 3 mm

**Density**

ρ = 2,75 g/cm³

**Knoop hardness**

HK[0.1/20]

### Thermal properties

**Transformation temperature**

Tg = 444 °C

**Thermal expansion in** $10^{-6}$/K

$\alpha_{(-30°C/+70°C)}$

$\alpha_{(20°C/300°C)}$

$\alpha_{(20°C/200°C)}$ = 9,7

### Chemical properties

**Chemical resistance**

FR class = 0

SR class = 4

AR class = 3

**Resistance against humidity**

Delicate glass

see pocket catalogue "Optical Filter Glass 2020", chapter 5.5

### Colormetric properties

| | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | 0,206 | 0,176 | 0,160 |
| | y | 0,328 | 0,334 | 0,346 |
| | Y | 50,5 | 35,3 | 26,4 |
| | $\lambda_d$ | 491,5 | 492,0 | 492,9 |
| | $P_e$ | 0,388 | 0,496 | 0,544 |
| Illuminant A | x | 0,277 | 0,218 | 0,189 |
| | y | 0,459 | 0,474 | 0,486 |
| | Y | 41,3 | 26,9 | 19,3 |
| | $\lambda_d$ | 500,1 | 499,8 | 500,1 |
| | $P_e$ | 0,388 | 0,522 | 0,588 |

### Notes

Ionically colored glass

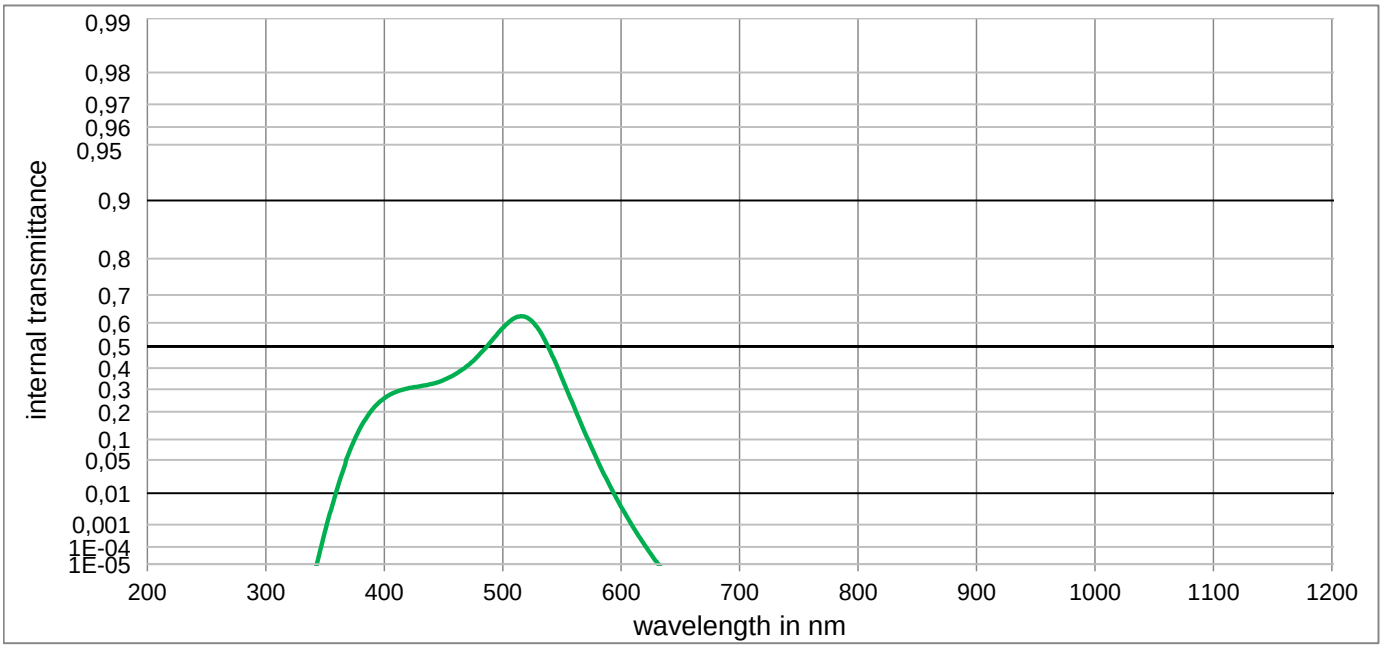
Bandpass filter

NIR cutoff filter

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

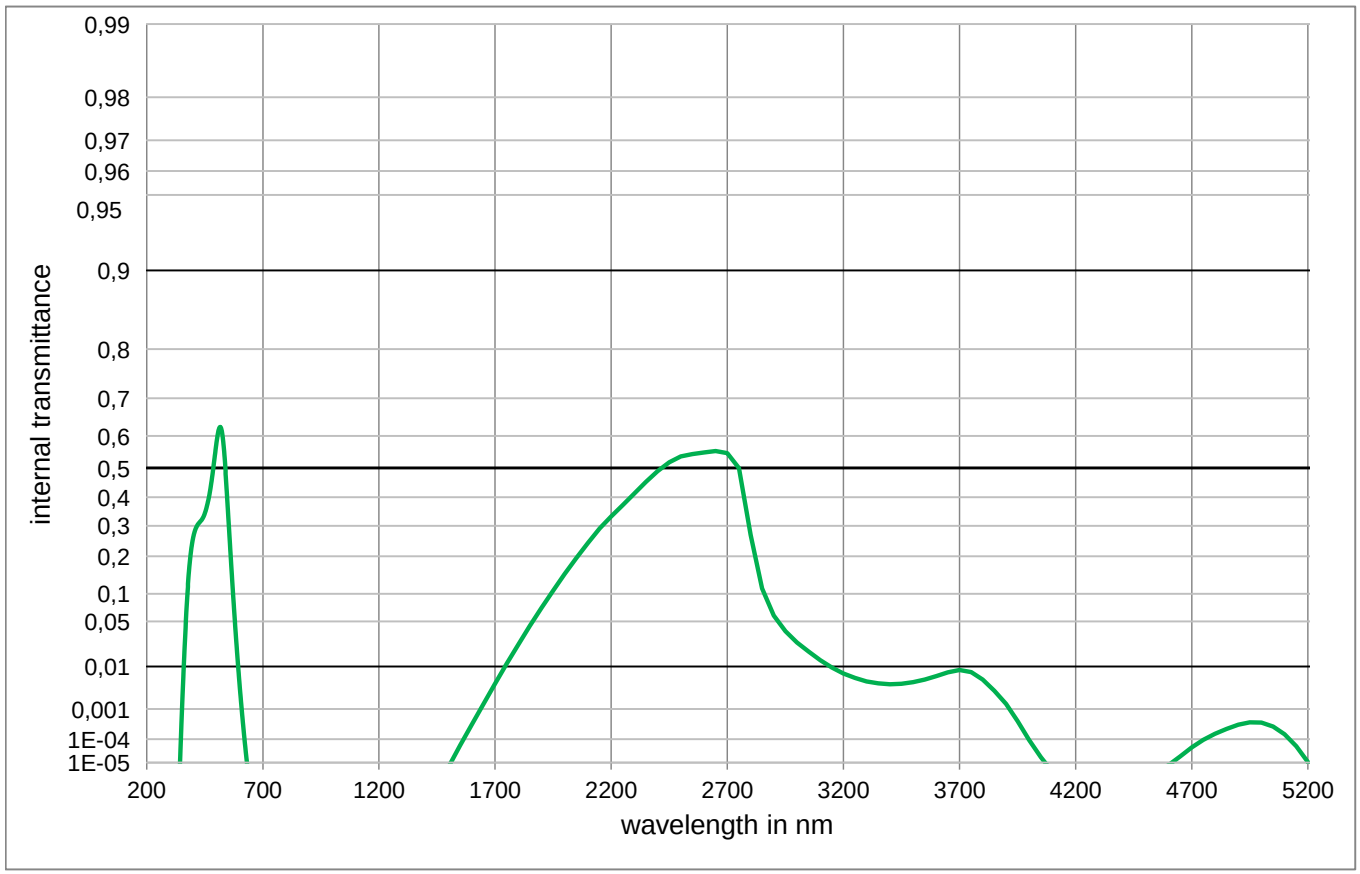
### Disclaimer

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



# Data Sheet

## S8023




**Internal transmittance ti at reference thickness**

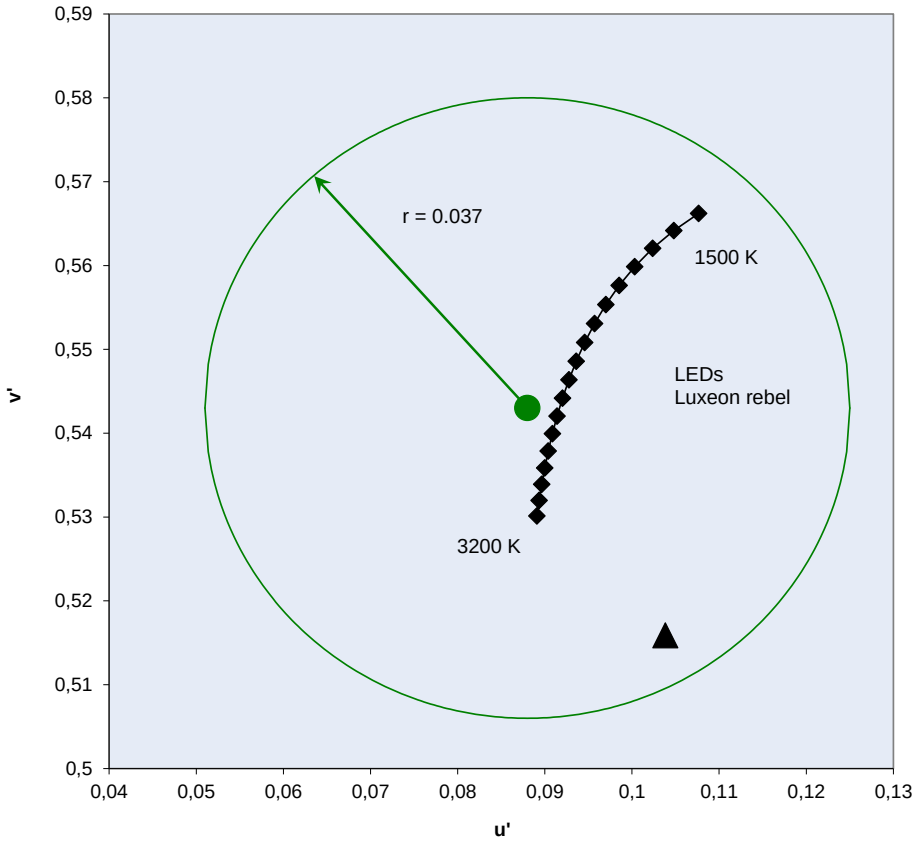
**The internal transmittance values, tabulated and graphically represented, are reference values only**

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 5,796E-01 | 800 | < 1,000E-05 | 1100 | < 1,000E-05 | 2200 | 3,323E-01 | 3700 | 8,548E-03 |
| 210 | < 1,0E-05 | 510 | 6,186E-01 | 810 | < 1,000E-05 | 1110 | < 1,000E-05 | 2250 | 3,728E-01 | 3750 | 7,773E-03 |
| 220 | < 1,0E-05 | 520 | 6,216E-01 | 820 | < 1,000E-05 | 1120 | < 1,000E-05 | 2300 | 4,136E-01 | 3800 | 5,431E-03 |
| 230 | < 1,0E-05 | 530 | 5,754E-01 | 830 | < 1,000E-05 | 1130 | < 1,000E-05 | 2350 | 4,531E-01 | 3850 | 3,027E-03 |
| 240 | < 1,0E-05 | 540 | 4,804E-01 | 840 | < 1,000E-05 | 1140 | < 1,000E-05 | 2400 | 4,891E-01 | 3900 | 1,397E-03 |
| 250 | < 1,0E-05 | 550 | 3,530E-01 | 850 | < 1,000E-05 | 1150 | < 1,000E-05 | 2450 | 5,187E-01 | 3950 | 4,345E-04 |
| 260 | < 1,0E-05 | 560 | 2,225E-01 | 860 | < 1,000E-05 | 1160 | < 1,000E-05 | 2500 | 5,374E-01 | 4000 | 9,178E-05 |
| 270 | < 1,0E-05 | 570 | 1,162E-01 | 870 | < 1,000E-05 | 1170 | < 1,000E-05 | 2550 | 5,451E-01 | 4050 | 1,790E-05 |
| 280 | < 1,0E-05 | 580 | 4,910E-02 | 880 | < 1,000E-05 | 1180 | < 1,000E-05 | 2600 | 5,502E-01 | 4100 | < 1,000E-05 |
| 290 | < 1,0E-05 | 590 | 1,618E-02 | 890 | < 1,000E-05 | 1190 | < 1,000E-05 | 2650 | 5,547E-01 | 4150 | < 1,000E-05 |
| 300 | < 1,0E-05 | 600 | 4,118E-03 | 900 | < 1,000E-05 | 1200 | < 1,000E-05 | 2700 | 5,481E-01 | 4200 | < 1,000E-05 |
| 310 | < 1,0E-05 | 610 | 8,105E-04 | 910 | < 1,000E-05 | 1250 | < 1,000E-05 | 2750 | 4,994E-01 | 4250 | < 1,000E-05 |
| 320 | < 1,000E-05 | 620 | 1,208E-04 | 920 | < 1,000E-05 | 1300 | < 1,000E-05 | 2800 | 2,689E-01 | 4300 | < 1,000E-05 |
| 330 | < 1,000E-05 | 630 | 1,360E-05 | 930 | < 1,000E-05 | 1350 | < 1,000E-05 | 2850 | 1,121E-01 | 4350 | < 1,000E-05 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | < 1,000E-05 | 1400 | < 1,000E-05 | 2900 | 5,898E-02 | 4400 | < 1,000E-05 |
| 350 | 5,305E-04 | 650 | < 1,000E-05 | 950 | < 1,000E-05 | 1450 | < 1,000E-05 | 2950 | 3,724E-02 | 4450 | < 1,000E-05 |
| 360 | 1,243E-02 | 660 | < 1,000E-05 | 960 | < 1,000E-05 | 1500 | < 1,000E-05 | 3000 | 2,578E-02 | 4500 | < 1,000E-05 |
| 370 | 6,439E-02 | 670 | < 1,000E-05 | 970 | < 1,000E-05 | 1550 | 5,810E-05 | 3050 | 1,840E-02 | 4550 | < 1,000E-05 |
| 380 | 1,397E-01 | 680 | < 1,000E-05 | 980 | < 1,000E-05 | 1600 | 3,349E-04 | 3100 | 1,314E-02 | 4600 | < 1,000E-05 |
| 390 | 2,098E-01 | 690 | < 1,000E-05 | 990 | < 1,000E-05 | 1650 | 1,381E-03 | 3150 | 9,636E-03 | 4650 | 1,919E-05 |
| 400 | 2,590E-01 | 700 | < 1,000E-05 | 1000 | < 1,000E-05 | 1700 | 4,363E-03 | 3200 | 7,306E-03 | 4700 | 4,704E-05 |
| 410 | 2,881E-01 | 710 | < 1,000E-05 | 1010 | < 1,000E-05 | 1750 | 1,129E-02 | 3250 | 5,847E-03 | 4750 | 9,473E-05 |
| 420 | 3,042E-01 | 720 | < 1,000E-05 | 1020 | < 1,000E-05 | 1800 | 2,387E-02 | 3300 | 4,945E-03 | 4800 | 1,584E-04 |
| 430 | 3,144E-01 | 730 | < 1,000E-05 | 1030 | < 1,000E-05 | 1850 | 4,389E-02 | 3350 | 4,463E-03 | 4850 | 2,376E-04 |
| 440 | 3,249E-01 | 740 | < 1,000E-05 | 1040 | < 1,000E-05 | 1900 | 7,212E-02 | 3400 | 4,260E-03 | 4900 | 3,262E-04 |
| 450 | 3,430E-01 | 750 | < 1,000E-05 | 1050 | < 1,000E-05 | 1950 | 1,074E-01 | 3450 | 4,380E-03 | 4950 | 3,896E-04 |
| 460 | 3,719E-01 | 760 | < 1,000E-05 | 1060 | < 1,000E-05 | 2000 | 1,488E-01 | 3500 | 4,740E-03 | 5000 | 3,832E-04 |
| 470 | 4,097E-01 | 770 | < 1,000E-05 | 1070 | < 1,000E-05 | 2050 | 1,947E-01 | 3550 | 5,450E-03 | 5050 | 2,843E-04 |
| 480 | 4,614E-01 | 780 | < 1,000E-05 | 1080 | < 1,000E-05 | 2100 | 2,428E-01 | 3600 | 6,450E-03 | 5100 | 1,509E-04 |
| 490 | 5,213E-01 | 790 | < 1,000E-05 | 1090 | < 1,000E-05 | 2150 | 2,908E-01 | 3650 | 7,713E-03 | 5150 | 5,275E-05 |

# Data Sheet

## S8023

**Chromaticity dependence on Incandescent Color Temperature**




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

**NVIS Green A**

**NVIS Green A Chromaticity coodinates**
**(as defined by MIL-STD-3009)**

**u' = 0.088**
**v' = 0.543**

**with radius of tolerance r = 0.037**

# Data Sheet

## S8612

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,913 |
| **Spectral values guaranteed** | | | |
| | $\tau_i$ (500 nm) | ≥ | 0,96 |
| | $\tau_i$ (600 nm) | ≥ | 0,48 |
| | $\tau_i$ (700 nm) | < | 0,02 |
| | $\lambda$ ( $\tau_{i, max}$) [nm] | = | 500 ± 5 |
| **Refractive indices** | | | |
| | $n_F$ (486 nm) | = | 1,55 |
| | $n_e$ (546 nm) | = | 1,54 |
| | $n_d$ (587,6 nm) | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| | $B_1$ | | 0,9589 |
| | $B_2$ | | 0,3811 |
| | $B_3$ | | 1,1938 |
| | $C_1$ | | 8,342E-03 µm² |
| | $C_2$ | | 1,0187E-02 µm² |
| | $C_3$ | | 134,146 µm² |
| **Internal quality** | | | |
| Bubble class | | | 1 |

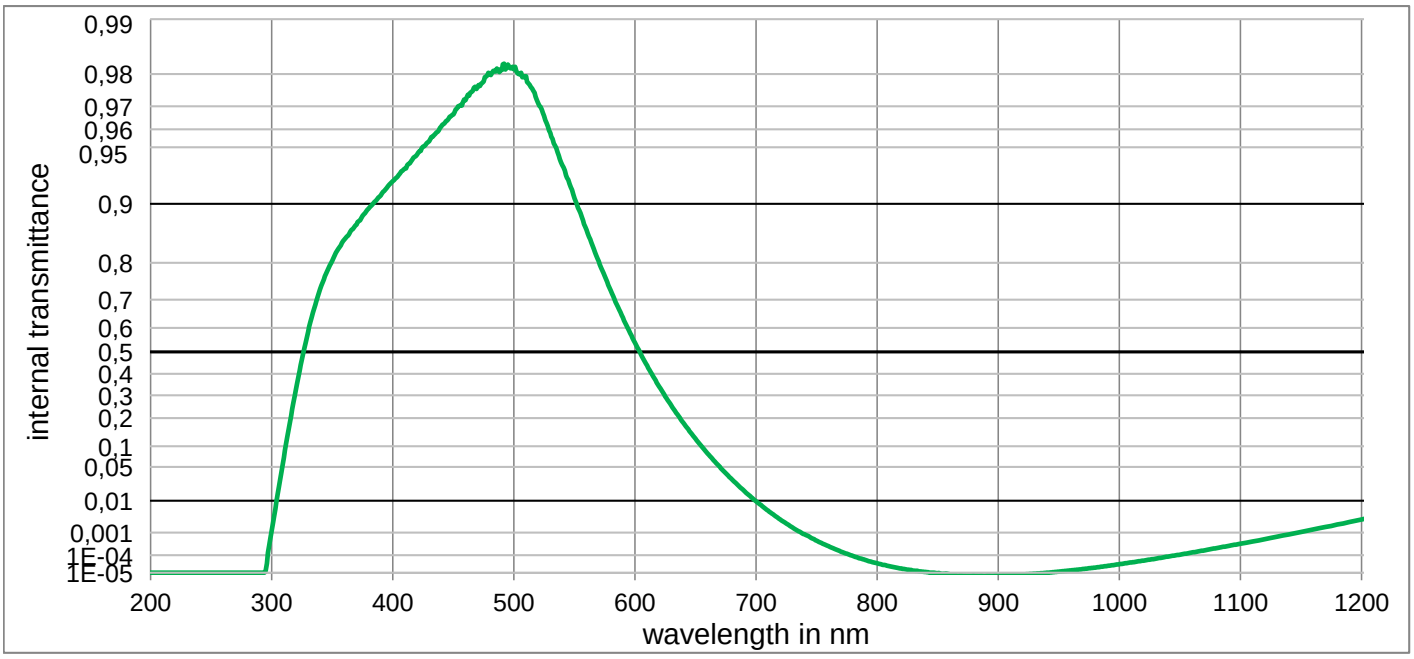
| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 2,66 g/cm³ |
| **Knoop hardness** | | | |
| | HK[0.1/20] | = | 470 |

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

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 3 |
| | AR class | = | 3 |
| **Resistance against humidity** | | | |
| Delicate glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

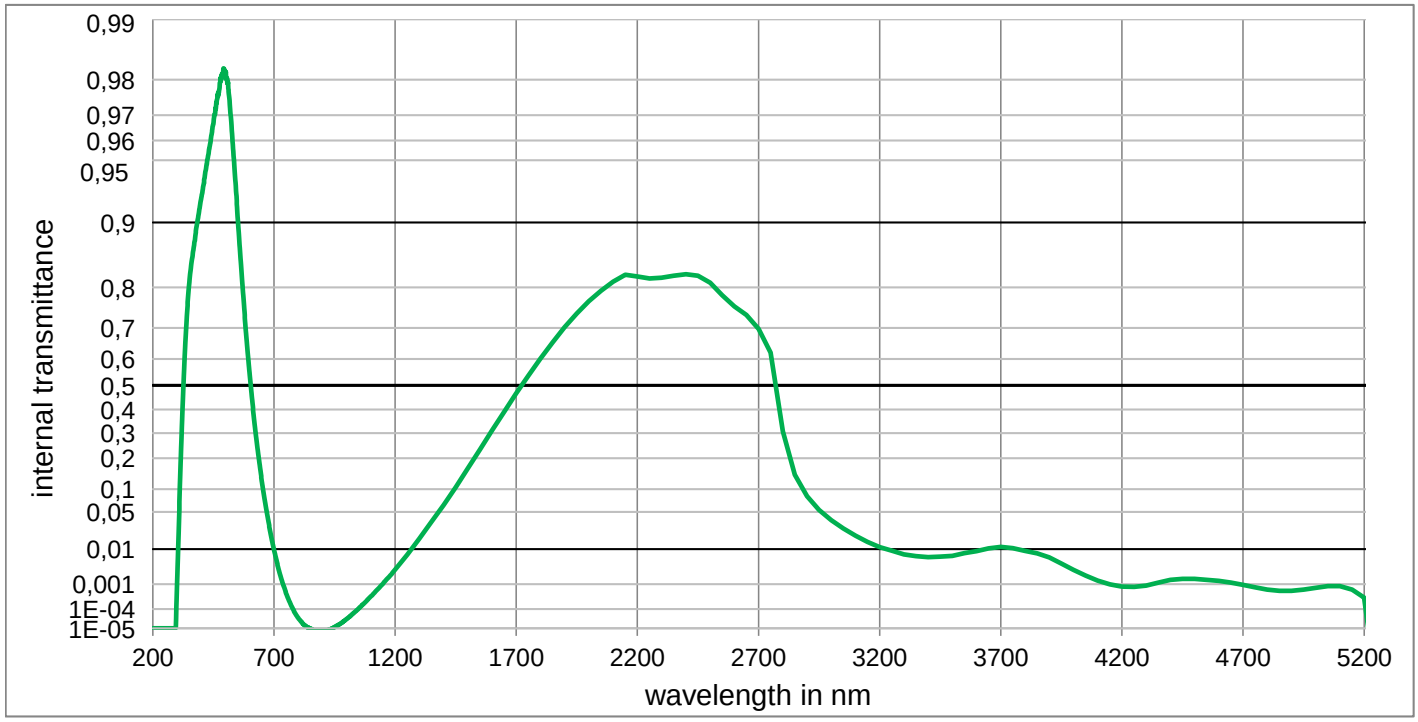
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,251 | 0,218 | 0,198 |
| | y | 0,321 | 0,311 | 0,302 |
| | Y | 72,1 | 61,5 | 54,4 |
| | $\lambda_d$ | 490 nm | 489 nm | 489 nm |
| | $P_e$ | 0,232 | 0,358 | 0,438 |
| Illuminant A | x | 0,356 |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

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter / Shortpass filter |
| NIR cutoff filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8612




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,812E-01 | 800 | 3,721E-05 | 1100 | 3,490E-04 | 2200 | 8,214E-01 | 3700 | 1,127E-02 |
| 210 | < 1,0E-05 | 510 | 9,794E-01 | 810 | 2,547E-05 | 1110 | 4,398E-04 | 2250 | 8,176E-01 | 3750 | 1,048E-02 |
| 220 | < 1,0E-05 | 520 | 9,712E-01 | 820 | 1,846E-05 | 1120 | 5,462E-04 | 2300 | 8,190E-01 | 3800 | 9,124E-03 |
| 230 | < 1,0E-05 | 530 | 9,581E-01 | 830 | 1,353E-05 | 1130 | 6,882E-04 | 2350 | 8,230E-01 | 3850 | 7,921E-03 |
| 240 | < 1,0E-05 | 540 | 9,376E-01 | 840 | 1,144E-05 | 1140 | 8,525E-04 | 2400 | 8,257E-01 | 3900 | 6,253E-03 |
| 250 | < 1,0E-05 | 550 | 9,064E-01 | 850 | < 1,000E-05 | 1150 | 1,056E-03 | 2450 | 8,228E-01 | 3950 | 4,323E-03 |
| 260 | < 1,0E-05 | 560 | 8,634E-01 | 860 | < 1,000E-05 | 1160 | 1,303E-03 | 2500 | 8,093E-01 | 4000 | 2,878E-03 |
| 270 | < 1,0E-05 | 570 | 8,031E-01 | 870 | < 1,000E-05 | 1170 | 1,600E-03 | 2550 | 7,833E-01 | 4050 | 1,922E-03 |
| 280 | < 1,0E-05 | 580 | 7,281E-01 | 880 | < 1,000E-05 | 1180 | 1,949E-03 | 2600 | 7,570E-01 | 4100 | 1,324E-03 |
| 290 | < 1,0E-05 | 590 | 6,380E-01 | 890 | < 1,000E-05 | 1190 | 2,376E-03 | 2650 | 7,355E-01 | 4150 | 9,941E-04 |
| 300 | 1,2E-03 | 600 | 5,394E-01 | 900 | < 1,000E-05 | 1200 | 2,905E-03 | 2700 | 6,974E-01 | 4200 | 8,230E-04 |
| 310 | 7,0E-02 | 610 | 4,375E-01 | 910 | < 1,000E-05 | 1250 | 7,369E-03 | 2750 | 6,221E-01 | 4250 | 8,062E-04 |
| 320 | 3,262E-01 | 620 | 3,402E-01 | 920 | < 1,000E-05 | 1300 | 1,688E-02 | 2800 | 3,075E-01 | 4300 | 8,948E-04 |
| 330 | 5,836E-01 | 630 | 2,532E-01 | 930 | < 1,000E-05 | 1350 | 3,500E-02 | 2850 | 1,427E-01 | 4350 | 1,139E-03 |
| 340 | 7,324E-01 | 640 | 1,806E-01 | 940 | < 1,000E-05 | 1400 | 6,250E-02 | 2900 | 8,200E-02 | 4400 | 1,405E-03 |
| 350 | 8,052E-01 | 650 | 1,227E-01 | 950 | 1,169E-05 | 1450 | 1,056E-01 | 2950 | 5,346E-02 | 4450 | 1,517E-03 |
| 360 | 8,471E-01 | 660 | 8,015E-02 | 960 | 1,407E-05 | 1500 | 1,633E-01 | 3000 | 3,712E-02 | 4500 | 1,498E-03 |
| 370 | 8,719E-01 | 670 | 5,011E-02 | 970 | 1,696E-05 | 1550 | 2,331E-01 | 3050 | 2,668E-02 | 4550 | 1,412E-03 |
| 380 | 8,942E-01 | 680 | 3,002E-02 | 980 | 2,080E-05 | 1600 | 3,106E-01 | 3100 | 1,947E-02 | 4600 | 1,288E-03 |
| 390 | 9,098E-01 | 690 | 1,724E-02 | 990 | 2,577E-05 | 1650 | 3,906E-01 | 3150 | 1,445E-02 | 4650 | 1,134E-03 |
| 400 | 9,241E-01 | 700 | 9,713E-03 | 1000 | 3,264E-05 | 1700 | 4,675E-01 | 3200 | 1,116E-02 | 4700 | 9,531E-04 |
| 410 | 9,351E-01 | 710 | 5,318E-03 | 1010 | 4,113E-05 | 1750 | 5,384E-01 | 3250 | 9,156E-03 | 4750 | 7,737E-04 |
| 420 | 9,452E-01 | 720 | 2,878E-03 | 1020 | 5,209E-05 | 1800 | 6,014E-01 | 3300 | 7,488E-03 | 4800 | 6,368E-04 |
| 430 | 9,536E-01 | 730 | 1,550E-03 | 1030 | 6,608E-05 | 1850 | 6,560E-01 | 3350 | 6,807E-03 | 4850 | 5,693E-04 |
| 440 | 9,614E-01 | 740 | 8,691E-04 | 1040 | 8,476E-05 | 1900 | 7,019E-01 | 3400 | 6,426E-03 | 4900 | 5,713E-04 |
| 450 | 9,668E-01 | 750 | 4,709E-04 | 1050 | 1,072E-04 | 1950 | 7,397E-01 | 3450 | 6,601E-03 | 4950 | 6,405E-04 |
| 460 | 9,722E-01 | 760 | 2,680E-04 | 1060 | 1,355E-04 | 2000 | 7,696E-01 | 3500 | 6,905E-03 | 5000 | 7,477E-04 |
| 470 | 9,764E-01 | 770 | 1,513E-04 | 1070 | 1,735E-04 | 2050 | 7,930E-01 | 3550 | 7,981E-03 | 5050 | 8,493E-04 |
| 480 | 9,801E-01 | 780 | 9,133E-05 | 1080 | 2,205E-04 | 2100 | 8,115E-01 | 3600 | 8,930E-03 | 5100 | 8,478E-04 |
| 490 | 9,810E-01 | 790 | 5,627E-05 | 1090 | 2,782E-04 | 2150 | 8,248E-01 | 3650 | 1,037E-02 | 5150 | 6,335E-04 |

# Data Sheet

## VG9

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,911 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (450 nm) | | ≤ | 0,21 |
| $\tau_i$ (514 nm) | | ≥ | 0,67 |
| $\tau_i$ (633 nm) | | ≤ | 0,15 |
| $\tau_i$ (725 nm) | | ≤ | 0,07 |
| $\tau_i$ (1060 nm) | | ≤ | 0,18 |
| **Refractive indices** | | | |
| $n_d$ (587,6 nm) | | = | 1,55 |
| **Sellmeier coefficients** | | | |
| on request | | | |
| **Internal quality** | | | |
| Bubble class | | | 1 |

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

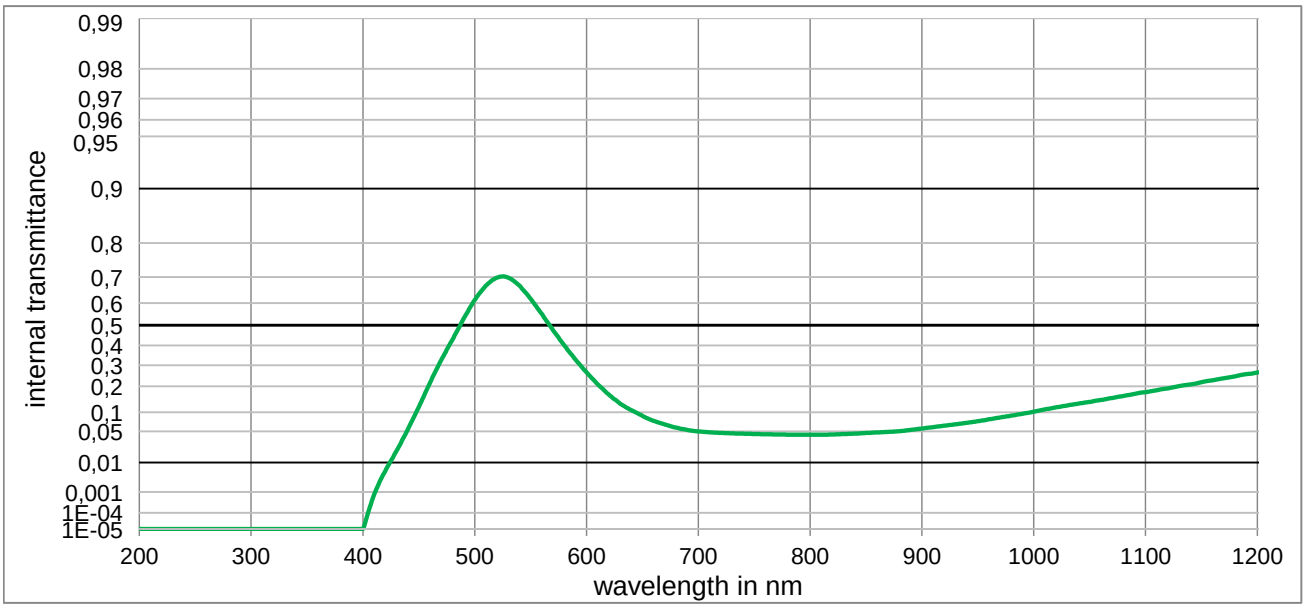
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 451 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 9,2 |
| $\alpha_{(20°C/300°C)}$ | | = | 10,6 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Robust glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", 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 |

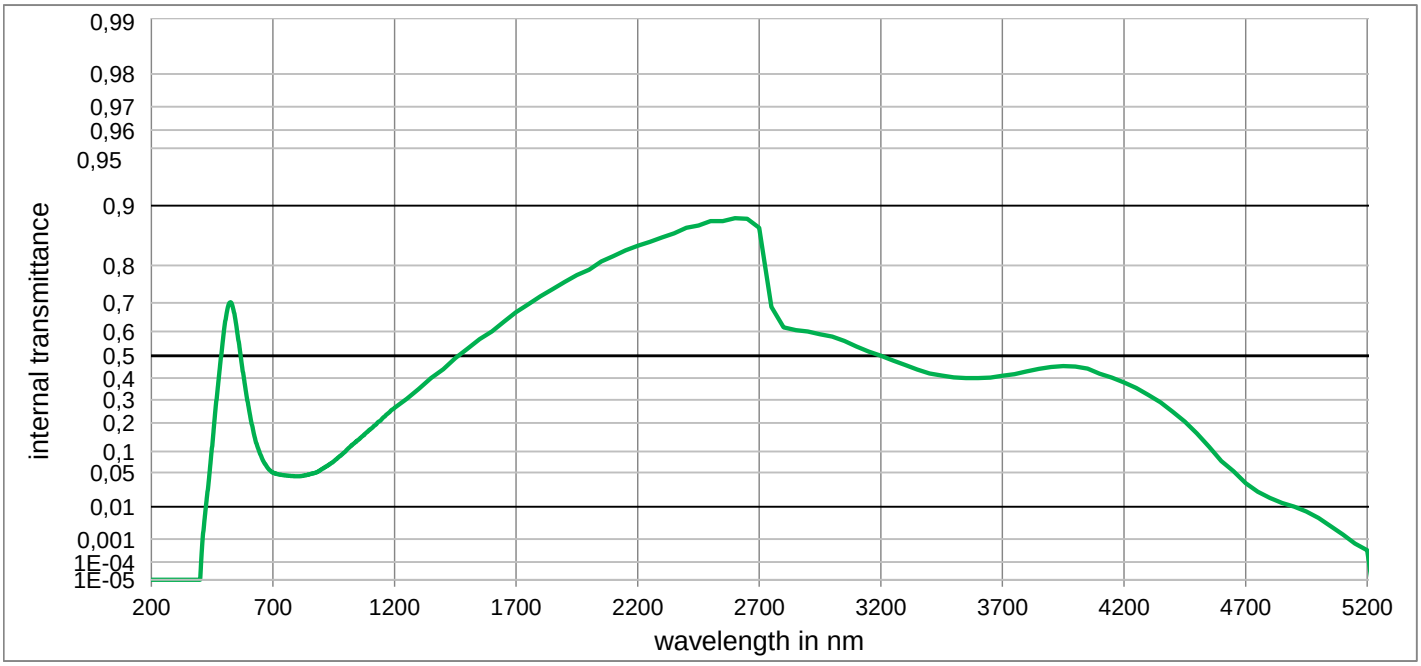
| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## VG9




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | 6,130E-01 | 800 | 4,315E-02 | 1100 | 1,745E-01 | 2200 | 8,400E-01 | 3700 | 4,100E-01 |
| 210 | < | 1,0E-05 | 510 | 6,690E-01 | 810 | 4,327E-02 | 1110 | 1,824E-01 | 2250 | 8,472E-01 | 3750 | 4,175E-01 |
| 220 | < | 1,0E-05 | 520 | 6,980E-01 | 820 | 4,381E-02 | 1120 | 1,907E-01 | 2300 | 8,548E-01 | 3800 | 4,300E-01 |
| 230 | < | 1,0E-05 | 530 | 6,980E-01 | 830 | 4,462E-02 | 1130 | 2,013E-01 | 2350 | 8,614E-01 | 3850 | 4,420E-01 |
| 240 | < | 1,0E-05 | 540 | 6,690E-01 | 840 | 4,547E-02 | 1140 | 2,079E-01 | 2400 | 8,700E-01 | 3900 | 4,500E-01 |
| 250 | < | 1,0E-05 | 550 | 6,180E-01 | 850 | 4,674E-02 | 1150 | 2,184E-01 | 2450 | 8,736E-01 | 3950 | 4,542E-01 |
| 260 | < | 1,0E-05 | 560 | 5,520E-01 | 860 | 4,781E-02 | 1160 | 2,273E-01 | 2500 | 8,800E-01 | 4000 | 4,524E-01 |
| 270 | < | 1,0E-05 | 570 | 4,770E-01 | 870 | 4,890E-02 | 1170 | 2,372E-01 | 2550 | 8,800E-01 | 4050 | 4,429E-01 |
| 280 | < | 1,0E-05 | 580 | 4,010E-01 | 880 | 5,036E-02 | 1180 | 2,460E-01 | 2600 | 8,840E-01 | 4100 | 4,200E-01 |
| 290 | < | 1,0E-05 | 590 | 3,300E-01 | 890 | 5,300E-02 | 1190 | 2,562E-01 | 2650 | 8,830E-01 | 4150 | 4,015E-01 |
| 300 | < | 1,0E-05 | 600 | 2,650E-01 | 900 | 5,608E-02 | 1200 | 2,644E-01 | 2700 | 8,700E-01 | 4200 | 3,800E-01 |
| 310 | < | 1,0E-05 | 610 | 2,090E-01 | 910 | 5,926E-02 | 1250 | 3,044E-01 | 2750 | 6,870E-01 | 4250 | 3,543E-01 |
| 320 | < | 1,000E-05 | 620 | 1,640E-01 | 920 | 6,255E-02 | 1300 | 3,500E-01 | 2800 | 6,154E-01 | 4300 | 3,223E-01 |
| 330 | < | 1,000E-05 | 630 | 1,300E-01 | 930 | 6,600E-02 | 1350 | 4,000E-01 | 2850 | 6,050E-01 | 4350 | 2,884E-01 |
| 340 | < | 1,000E-05 | 640 | 1,070E-01 | 940 | 6,967E-02 | 1400 | 4,400E-01 | 2900 | 6,000E-01 | 4400 | 2,469E-01 |
| 350 | < | 1,000E-05 | 650 | 8,900E-02 | 950 | 7,392E-02 | 1450 | 4,901E-01 | 2950 | 5,890E-01 | 4450 | 2,054E-01 |
| 360 | < | 1,000E-05 | 660 | 7,500E-02 | 960 | 7,900E-02 | 1500 | 5,300E-01 | 3000 | 5,800E-01 | 4500 | 1,600E-01 |
| 370 | < | 1,000E-05 | 670 | 6,558E-02 | 970 | 8,434E-02 | 1550 | 5,702E-01 | 3050 | 5,626E-01 | 4550 | 1,140E-01 |
| 380 | < | 1,000E-05 | 680 | 5,811E-02 | 980 | 8,972E-02 | 1600 | 6,000E-01 | 3100 | 5,400E-01 | 4600 | 7,450E-02 |
| 390 | < | 1,000E-05 | 690 | 5,297E-02 | 990 | 9,538E-02 | 1650 | 6,371E-01 | 3150 | 5,183E-01 | 4650 | 5,248E-02 |
| 400 | < | 1,000E-05 | 700 | 4,985E-02 | 1000 | 1,020E-01 | 1700 | 6,700E-01 | 3200 | 5,000E-01 | 4700 | 3,251E-02 |
| 410 | | 7,621E-04 | 710 | 4,816E-02 | 1010 | 1,091E-01 | 1750 | 6,955E-01 | 3250 | 4,787E-01 | 4750 | 2,203E-02 |
| 420 | | 5,715E-03 | 720 | 4,695E-02 | 1020 | 1,162E-01 | 1800 | 7,200E-01 | 3300 | 4,600E-01 | 4800 | 1,614E-02 |
| 430 | | 1,963E-02 | 730 | 4,597E-02 | 1030 | 1,230E-01 | 1850 | 7,407E-01 | 3350 | 4,392E-01 | 4850 | 1,230E-02 |
| 440 | | 5,343E-02 | 740 | 4,533E-02 | 1040 | 1,295E-01 | 1900 | 7,600E-01 | 3400 | 4,213E-01 | 4900 | 1,000E-02 |
| 450 | | 1,170E-01 | 750 | 4,479E-02 | 1050 | 1,360E-01 | 1950 | 7,775E-01 | 3450 | 4,118E-01 | 4950 | 7,534E-03 |
| 460 | | 2,160E-01 | 760 | 4,422E-02 | 1060 | 1,430E-01 | 2000 | 7,900E-01 | 3500 | 4,034E-01 | 5000 | 5,000E-03 |
| 470 | | 3,250E-01 | 770 | 4,387E-02 | 1070 | 1,510E-01 | 2050 | 8,086E-01 | 3550 | 4,000E-01 | 5050 | 2,773E-03 |
| 480 | | 4,290E-01 | 780 | 4,354E-02 | 1080 | 1,590E-01 | 2100 | 8,200E-01 | 3600 | 4,000E-01 | 5100 | 1,455E-03 |
| 490 | | 5,300E-01 | 790 | 4,328E-02 | 1090 | 1,670E-01 | 2150 | 8,312E-01 | 3650 | 4,024E-01 | 5150 | 6,637E-04 |

# Data Sheet

## VG20

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,913 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (450 nm) | ≥ | 0,75 | |
| $\tau_i$ (500 nm) | ≥ | 0,83 | |
| $\tau_i$ (550 nm) | ≥ | 0,65 | |
| $\tau_i$ (600 nm) | ≤ | 0,19 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,55 | |
| $n_e$ (546 nm) | = | 1,54 | |
| $n_d$ (587,6 nm) | = | 1,54 | |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | | 0,7165 | |
| $B_2$ | | 0,6218 | |
| $B_3$ | | 0,6042 | |
| $C_1$ | | 1,764E-09 | µm² |
| $C_2$ | | 1,9422E-02 | µm² |
| $C_3$ | | 100,000 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

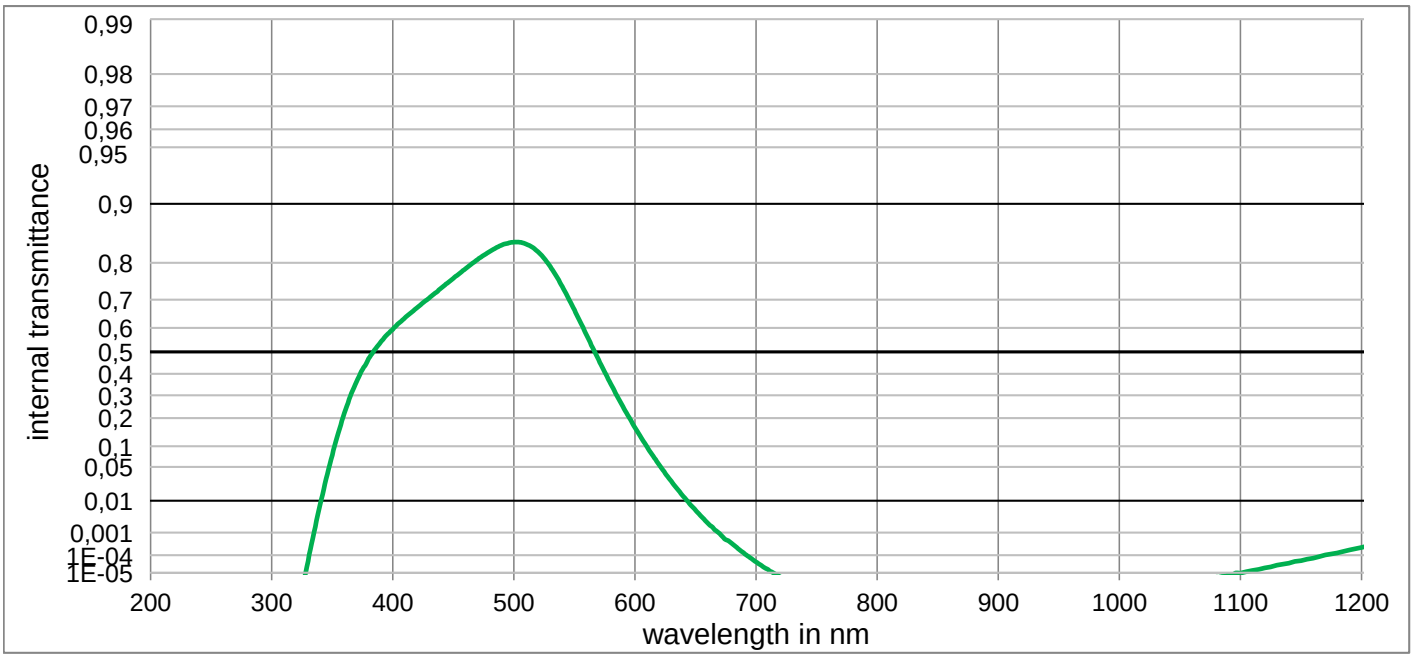
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 1,00 mm |
| **Density** | | |
| ρ | = | 2,85 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | = | 364 |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 52.3 |
| AR class | = | 3.3 |
| **Resistance against humidity** | | |
| Sensitive glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

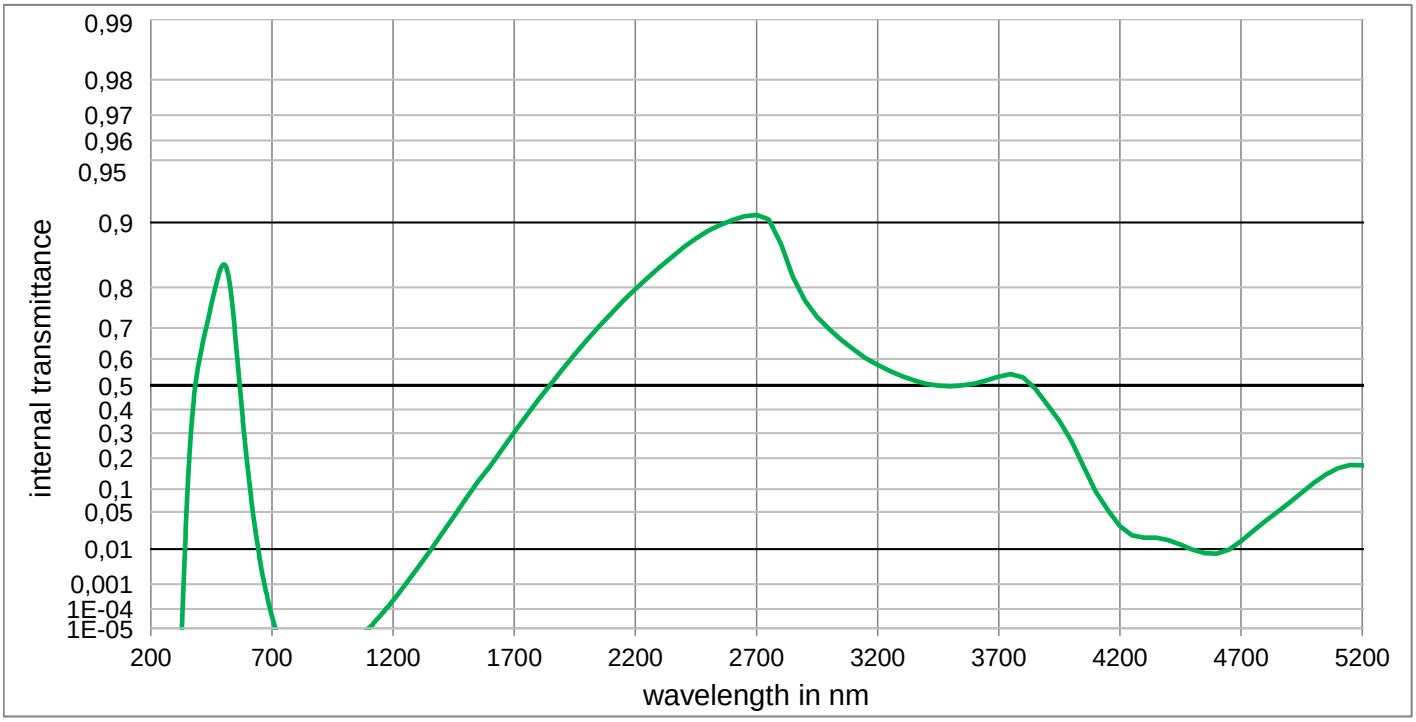
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,203 | 0,170 | 0,154 |
| | y | 0,312 | 0,300 | 0,294 |
| | Y | 49,0 | 33,2 | 24,1 |
| | $\lambda_d$ | 490 nm | 489 nm | 489 nm |
| | $P_e$ | 0,413 | 0,543 | 0,607 |
| Illuminant A | x | 0,274 | 0,211 | 0,179 |
| | y | 0,445 | 0,441 | 0,434 |
| | Y | 39,9 | 24,9 | 17,2 |
| | $\lambda_d$ | 499 nm | 497 nm | 496 nm |
| | $P_e$ | 0,398 | 0,549 | 0,625 |

| Notes |
|---|
| |
| Ionically colored glass |
| Bandpass filter |
| NIR cutoff filter |
| lambda_50%(d=0.3mm) @ 604 nm |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## VG20




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 8,425E-01 | 800 | < 1,000E-05 | 1100 | < 1,000E-05 | 2200 | 7,964E-01 | 3700 | 5,342E-01 |
| 210 | < 1,0E-05 | 510 | 8,389E-01 | 810 | < 1,000E-05 | 1110 | 1,392E-05 | 2250 | 8,185E-01 | 3750 | 5,437E-01 |
| 220 | < 1,0E-05 | 520 | 8,236E-01 | 820 | < 1,000E-05 | 1120 | 1,999E-05 | 2300 | 8,379E-01 | 3800 | 5,316E-01 |
| 230 | < 1,0E-05 | 530 | 7,914E-01 | 830 | < 1,000E-05 | 1130 | 2,837E-05 | 2350 | 8,541E-01 | 3850 | 4,866E-01 |
| 240 | < 1,0E-05 | 540 | 7,393E-01 | 840 | < 1,000E-05 | 1140 | 3,755E-05 | 2400 | 8,694E-01 | 3900 | 4,207E-01 |
| 250 | < 1,0E-05 | 550 | 6,655E-01 | 850 | < 1,000E-05 | 1150 | 5,176E-05 | 2450 | 8,808E-01 | 3950 | 3,509E-01 |
| 260 | < 1,0E-05 | 560 | 5,721E-01 | 860 | < 1,000E-05 | 1160 | 7,067E-05 | 2500 | 8,905E-01 | 4000 | 2,676E-01 |
| 270 | < 1,0E-05 | 570 | 4,641E-01 | 870 | < 1,000E-05 | 1170 | 1,026E-04 | 2550 | 8,973E-01 | 4050 | 1,689E-01 |
| 280 | < 1,0E-05 | 580 | 3,534E-01 | 880 | < 1,000E-05 | 1180 | 1,293E-04 | 2600 | 9,027E-01 | 4100 | 9,411E-02 |
| 290 | < 1,0E-05 | 590 | 2,493E-01 | 890 | < 1,000E-05 | 1190 | 1,808E-04 | 2650 | 9,067E-01 | 4150 | 5,303E-02 |
| 300 | < 1,0E-05 | 600 | 1,627E-01 | 900 | < 1,000E-05 | 1200 | 2,372E-04 | 2700 | 9,079E-01 | 4200 | 2,924E-02 |
| 310 | < 1,0E-05 | 610 | 9,760E-02 | 910 | < 1,000E-05 | 1250 | 9,582E-04 | 2750 | 9,034E-01 | 4250 | 1,970E-02 |
| 320 | < 1,000E-05 | 620 | 5,393E-02 | 920 | < 1,000E-05 | 1300 | 3,153E-03 | 2800 | 8,741E-01 | 4300 | 1,772E-02 |
| 330 | 4,871E-05 | 630 | 2,735E-02 | 930 | < 1,000E-05 | 1350 | 8,739E-03 | 2850 | 8,210E-01 | 4350 | 1,772E-02 |
| 340 | 7,922E-03 | 640 | 1,274E-02 | 940 | < 1,000E-05 | 1400 | 2,078E-02 | 2900 | 7,707E-01 | 4400 | 1,571E-02 |
| 350 | 7,618E-02 | 650 | 5,556E-03 | 950 | < 1,000E-05 | 1450 | 4,231E-02 | 2950 | 7,303E-01 | 4450 | 1,258E-02 |
| 360 | 2,203E-01 | 660 | 2,205E-03 | 960 | < 1,000E-05 | 1500 | 7,563E-02 | 3000 | 6,961E-01 | 4500 | 9,730E-03 |
| 370 | 3,634E-01 | 670 | 8,986E-04 | 970 | < 1,000E-05 | 1550 | 1,217E-01 | 3050 | 6,643E-01 | 4550 | 8,055E-03 |
| 380 | 4,698E-01 | 680 | 3,566E-04 | 980 | < 1,000E-05 | 1600 | 1,704E-01 | 3100 | 6,331E-01 | 4600 | 7,823E-03 |
| 390 | 5,425E-01 | 690 | 1,258E-04 | 990 | < 1,000E-05 | 1650 | 2,347E-01 | 3150 | 6,032E-01 | 4650 | 9,759E-03 |
| 400 | 5,941E-01 | 700 | 4,383E-05 | 1000 | < 1,000E-05 | 1700 | 3,036E-01 | 3200 | 5,784E-01 | 4700 | 1,497E-02 |
| 410 | 6,380E-01 | 710 | 1,529E-05 | 1010 | < 1,000E-05 | 1750 | 3,737E-01 | 3250 | 5,564E-01 | 4750 | 2,385E-02 |
| 420 | 6,736E-01 | 720 | < 1,000E-05 | 1020 | < 1,000E-05 | 1800 | 4,423E-01 | 3300 | 5,361E-01 | 4800 | 3,556E-02 |
| 430 | 7,056E-01 | 730 | < 1,000E-05 | 1030 | < 1,000E-05 | 1850 | 5,043E-01 | 3350 | 5,195E-01 | 4850 | 4,991E-02 |
| 440 | 7,350E-01 | 740 | < 1,000E-05 | 1040 | < 1,000E-05 | 1900 | 5,627E-01 | 3400 | 5,065E-01 | 4900 | 6,777E-02 |
| 450 | 7,620E-01 | 750 | < 1,000E-05 | 1050 | < 1,000E-05 | 1950 | 6,167E-01 | 3450 | 4,991E-01 | 4950 | 9,057E-02 |
| 460 | 7,861E-01 | 760 | < 1,000E-05 | 1060 | < 1,000E-05 | 2000 | 6,627E-01 | 3500 | 4,961E-01 | 5000 | 1,170E-01 |
| 470 | 8,074E-01 | 770 | < 1,000E-05 | 1070 | < 1,000E-05 | 2050 | 7,040E-01 | 3550 | 4,998E-01 | 5050 | 1,430E-01 |
| 480 | 8,244E-01 | 780 | < 1,000E-05 | 1080 | < 1,000E-05 | 2100 | 7,389E-01 | 3600 | 5,074E-01 | 5100 | 1,638E-01 |
| 490 | 8,370E-01 | 790 | < 1,000E-05 | 1090 | < 1,000E-05 | 2150 | 7,711E-01 | 3650 | 5,196E-01 | 5150 | 1,750E-01 |

# Data Sheet

## UG1

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,913 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | | ≥ | 0,8 |
| $\tau_i$ (405 nm) | | ≤ | 0,1 |
| $\tau_i$ (694 nm) | | ≤ | 0,06 |
| $\tau_i$ (750 nm) | | ≤ | 0,53 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | 0,9475 | | |
| $B_2$ | 0,3895 | | |
| $B_3$ | 1,1076 | | |
| $C_1$ | 9,783E-03 µm² | | |
| $C_2$ | 1,1182E-02 µm² | | |
| $C_3$ | 147,627 µm² | | |
| **Internal quality** | | | |
| Bubble class | 1 | | |

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

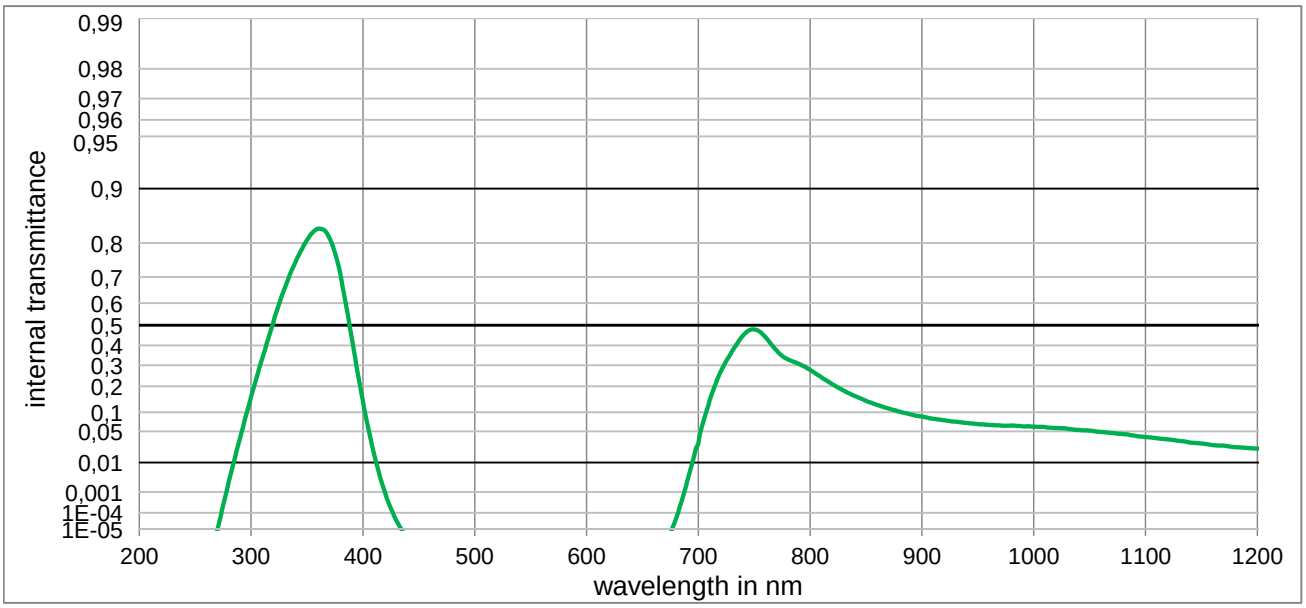
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 603 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 7,9 |
| $\alpha_{(20°C/300°C)}$ | | = | 8,9 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

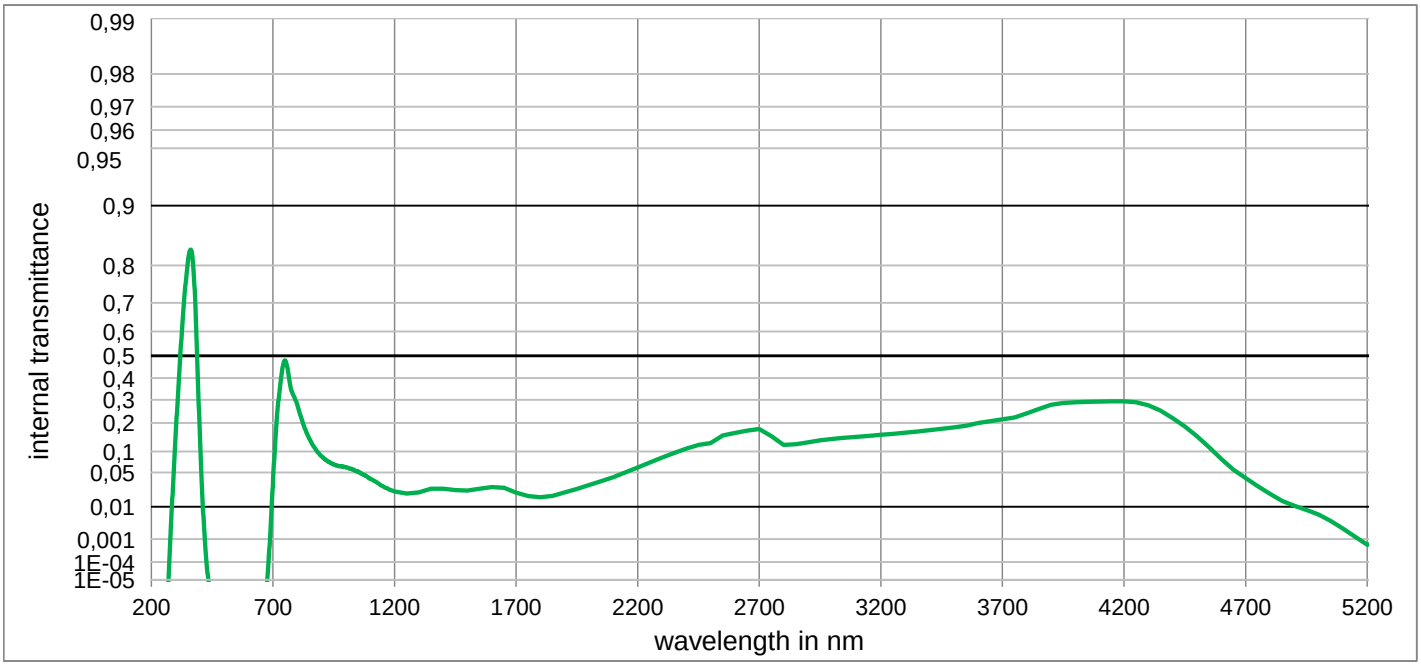
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Bandpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## UG1




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

| λ /nm | | $\tau_i$ | λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,0E-05 | 500 | < | 1,000E-05 | 800 | 2,769E-01 | 1100 | 3,919E-02 | 2200 | 5,979E-02 | 3700 | 2,146E-01 |
| 210 | < | 1,0E-05 | 510 | < | 1,000E-05 | 810 | 2,416E-01 | 1110 | 3,721E-02 | 2250 | 7,156E-02 | 3750 | 2,230E-01 |
| 220 | < | 1,0E-05 | 520 | < | 1,000E-05 | 820 | 2,091E-01 | 1120 | 3,533E-02 | 2300 | 8,324E-02 | 3800 | 2,400E-01 |
| 230 | < | 1,0E-05 | 530 | < | 1,000E-05 | 830 | 1,812E-01 | 1130 | 3,286E-02 | 2350 | 9,590E-02 | 3850 | 2,592E-01 |
| 240 | < | 1,0E-05 | 540 | < | 1,000E-05 | 840 | 1,584E-01 | 1140 | 3,046E-02 | 2400 | 1,083E-01 | 3900 | 2,774E-01 |
| 250 | < | 1,0E-05 | 550 | < | 1,000E-05 | 850 | 1,402E-01 | 1150 | 2,892E-02 | 2450 | 1,199E-01 | 3950 | 2,859E-01 |
| 260 | < | 1,0E-05 | 560 | < | 1,000E-05 | 860 | 1,250E-01 | 1160 | 2,682E-02 | 2500 | 1,262E-01 | 4000 | 2,887E-01 |
| 270 | < | 1,0E-05 | 570 | < | 1,000E-05 | 870 | 1,123E-01 | 1170 | 2,601E-02 | 2550 | 1,524E-01 | 4050 | 2,906E-01 |
| 280 | | 2,4E-03 | 580 | < | 1,000E-05 | 880 | 1,019E-01 | 1180 | 2,411E-02 | 2600 | 1,615E-01 | 4100 | 2,925E-01 |
| 290 | | 3,7E-02 | 590 | < | 1,000E-05 | 890 | 9,311E-02 | 1190 | 2,337E-02 | 2650 | 1,700E-01 | 4150 | 2,934E-01 |
| 300 | | 1,6E-01 | 600 | < | 1,000E-05 | 900 | 8,686E-02 | 1200 | 2,243E-02 | 2700 | 1,762E-01 | 4200 | 2,934E-01 |
| 310 | | 3,4E-01 | 610 | < | 1,000E-05 | 910 | 8,073E-02 | 1250 | 2,020E-02 | 2750 | 1,498E-01 | 4250 | 2,893E-01 |
| 320 | | 5,189E-01 | 620 | < | 1,000E-05 | 920 | 7,633E-02 | 1300 | 2,134E-02 | 2800 | 1,200E-01 | 4300 | 2,755E-01 |
| 330 | | 6,591E-01 | 630 | < | 1,000E-05 | 930 | 7,269E-02 | 1350 | 2,534E-02 | 2850 | 1,219E-01 | 4350 | 2,523E-01 |
| 340 | | 7,508E-01 | 640 | < | 1,000E-05 | 940 | 6,916E-02 | 1400 | 2,552E-02 | 2900 | 1,279E-01 | 4400 | 2,200E-01 |
| 350 | | 8,072E-01 | 650 | < | 1,000E-05 | 950 | 6,633E-02 | 1450 | 2,378E-02 | 2950 | 1,354E-01 | 4450 | 1,860E-01 |
| 360 | | 8,327E-01 | 660 | < | 1,000E-05 | 960 | 6,451E-02 | 1500 | 2,337E-02 | 3000 | 1,400E-01 | 4500 | 1,500E-01 |
| 370 | | 8,124E-01 | 670 | < | 1,000E-05 | 970 | 6,314E-02 | 1550 | 2,540E-02 | 3050 | 1,439E-01 | 4550 | 1,131E-01 |
| 380 | | 7,060E-01 | 680 | | 4,430E-05 | 980 | 6,293E-02 | 1600 | 2,746E-02 | 3100 | 1,476E-01 | 4600 | 8,000E-02 |
| 390 | | 4,380E-01 | 690 | | 2,460E-03 | 990 | 6,107E-02 | 1650 | 2,657E-02 | 3150 | 1,508E-01 | 4650 | 5,508E-02 |
| 400 | | 1,376E-01 | 700 | | 2,820E-02 | 1000 | 6,046E-02 | 1700 | 2,106E-02 | 3200 | 1,546E-01 | 4700 | 4,000E-02 |
| 410 | | 1,650E-02 | 710 | | 1,395E-01 | 1010 | 5,929E-02 | 1750 | 1,786E-02 | 3250 | 1,580E-01 | 4750 | 2,838E-02 |
| 420 | | 8,618E-04 | 720 | | 2,686E-01 | 1020 | 5,705E-02 | 1800 | 1,677E-02 | 3300 | 1,621E-01 | 4800 | 2,000E-02 |
| 430 | | 3,463E-05 | 730 | | 3,682E-01 | 1030 | 5,553E-02 | 1850 | 1,793E-02 | 3350 | 1,668E-01 | 4850 | 1,380E-02 |
| 440 | < | 1,000E-05 | 740 | | 4,499E-01 | 1040 | 5,300E-02 | 1900 | 2,145E-02 | 3400 | 1,718E-01 | 4900 | 1,057E-02 |
| 450 | < | 1,000E-05 | 750 | | 4,798E-01 | 1050 | 5,141E-02 | 1950 | 2,515E-02 | 3450 | 1,769E-01 | 4950 | 8,356E-03 |
| 460 | < | 1,000E-05 | 760 | | 4,419E-01 | 1060 | 4,881E-02 | 2000 | 3,012E-02 | 3500 | 1,825E-01 | 5000 | 6,281E-03 |
| 470 | < | 1,000E-05 | 770 | | 3,736E-01 | 1070 | 4,668E-02 | 2050 | 3,544E-02 | 3550 | 1,891E-01 | 5050 | 4,055E-03 |
| 480 | < | 1,000E-05 | 780 | | 3,298E-01 | 1080 | 4,456E-02 | 2100 | 4,160E-02 | 3600 | 1,995E-01 | 5100 | 2,328E-03 |
| 490 | < | 1,000E-05 | 790 | | 3,068E-01 | 1090 | 4,168E-02 | 2150 | 5,012E-02 | 3650 | 2,070E-01 | 5150 | 1,230E-03 |

# Data Sheet

## UG2A

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,918 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (303 nm) | | ≤ | 0,07 |
| $\tau_i$ (365 nm) | | ≥ | 0,81 |
| $\tau_i$ (405 nm) | | ≤ | 0,1 |
| $\tau_i$ (694 nm) | | ≤ | 0,04 |
| $\tau_i$ (750 nm) | | ≤ | 0,52 |
| | | | |
| | | | |
| | | | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,53 |
| $n_e$ (546 nm) | | = | 1,53 |
| $n_d$ (587,6 nm) | | = | 1,52 |
| | | | |
| **Sellmeier coefficients** | | | |
| valid from 295 nm to 1600 nm | | | |
| $B_1$ | 0,8819 | | |
| $B_2$ | 0,4027 | | |
| $B_3$ | 1,2925 | | |
| $C_1$ | 4,435E-03 | µm² | |
| $C_2$ | 2,0863E-02 | µm² | |
| $C_3$ | 169,418 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

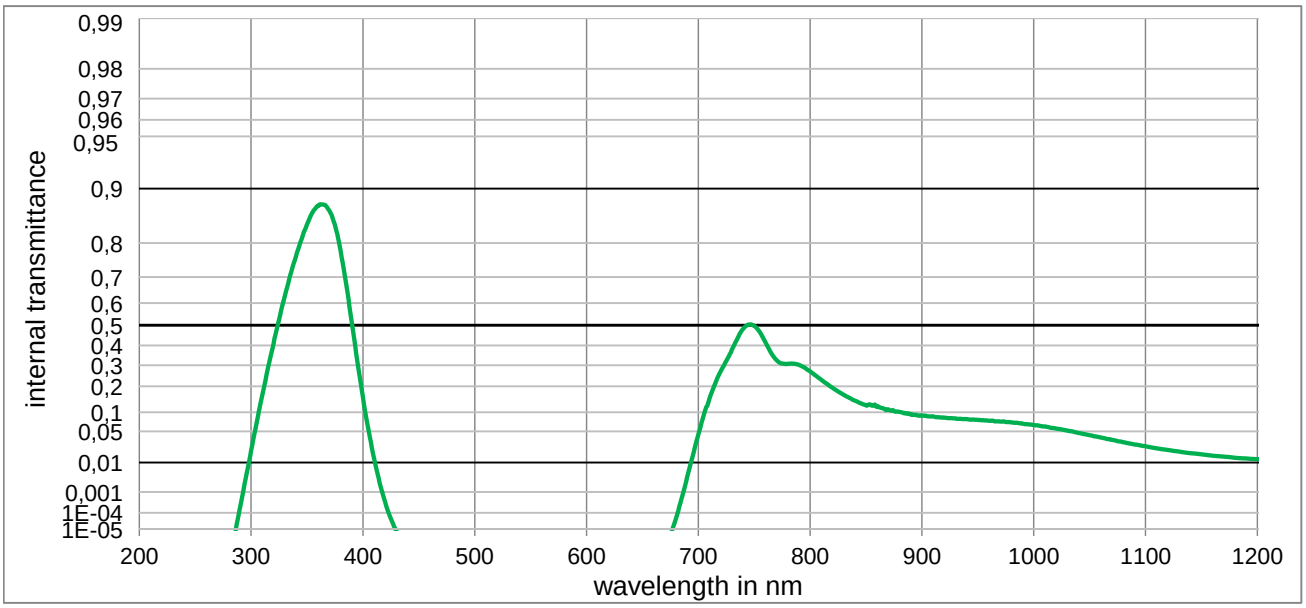
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 484 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 8,7 |
| $\alpha_{(20°C/300°C)}$ | | = | 9,9 |
| | | | |
| | | | |
| | | | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | | |
| | SR class | = | 1.0 |
| | AR class | = | 1.3 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

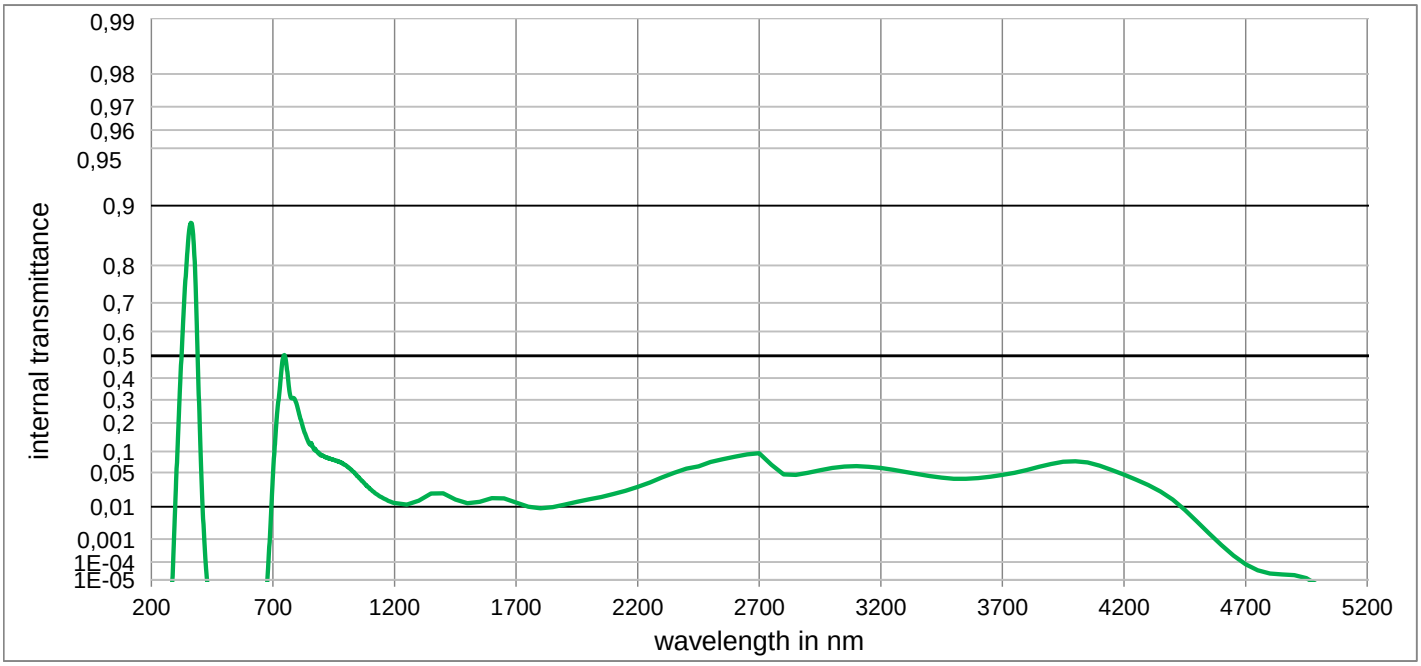
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Bandpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## UG2A




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 2,694E-01 | 1100 | 2,523E-02 | 2200 | 2,753E-02 | 3700 | 4,550E-02 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 2,291E-01 | 1110 | 2,269E-02 | 2250 | 3,365E-02 | 3750 | 4,960E-02 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 1,934E-01 | 1120 | 2,075E-02 | 2300 | 4,119E-02 | 3800 | 5,487E-02 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 1,638E-01 | 1130 | 1,906E-02 | 2350 | 4,948E-02 | 3850 | 6,125E-02 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 1,408E-01 | 1140 | 1,742E-02 | 2400 | 5,747E-02 | 3900 | 6,769E-02 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 1,232E-01 | 1150 | 1,630E-02 | 2450 | 6,255E-02 | 3950 | 7,273E-02 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 1,173E-01 | 1160 | 1,523E-02 | 2500 | 7,233E-02 | 4000 | 7,429E-02 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 1,091E-01 | 1170 | 1,438E-02 | 2550 | 7,920E-02 | 4050 | 7,123E-02 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 1,008E-01 | 1180 | 1,343E-02 | 2600 | 8,580E-02 | 4100 | 6,414E-02 |
| 290 | 1,8E-04 | 590 | < 1,000E-05 | 890 | 9,226E-02 | 1190 | 1,285E-02 | 2650 | 9,190E-02 | 4150 | 5,492E-02 |
| 300 | 2,0E-02 | 600 | < 1,000E-05 | 900 | 8,992E-02 | 1200 | 1,239E-02 | 2700 | 9,526E-02 | 4200 | 4,586E-02 |
| 310 | 1,6E-01 | 610 | < 1,000E-05 | 910 | 8,713E-02 | 1250 | 1,130E-02 | 2750 | 6,593E-02 | 4250 | 3,757E-02 |
| 320 | 4,089E-01 | 620 | < 1,000E-05 | 920 | 8,362E-02 | 1300 | 1,398E-02 | 2800 | 4,651E-02 | 4300 | 3,000E-02 |
| 330 | 6,267E-01 | 630 | < 1,000E-05 | 930 | 8,186E-02 | 1350 | 2,031E-02 | 2850 | 4,580E-02 | 4350 | 2,243E-02 |
| 340 | 7,641E-01 | 640 | < 1,000E-05 | 940 | 7,948E-02 | 1400 | 2,052E-02 | 2900 | 4,947E-02 | 4400 | 1,481E-02 |
| 350 | 8,415E-01 | 650 | < 1,000E-05 | 950 | 7,743E-02 | 1450 | 1,494E-02 | 2950 | 5,439E-02 | 4450 | 8,338E-03 |
| 360 | 8,747E-01 | 660 | < 1,000E-05 | 960 | 7,516E-02 | 1500 | 1,214E-02 | 3000 | 5,885E-02 | 4500 | 3,947E-03 |
| 370 | 8,670E-01 | 670 | < 1,000E-05 | 970 | 7,294E-02 | 1550 | 1,314E-02 | 3050 | 6,181E-02 | 4550 | 1,607E-03 |
| 380 | 7,794E-01 | 680 | 4,743E-05 | 980 | 7,087E-02 | 1600 | 1,595E-02 | 3100 | 6,279E-02 | 4600 | 5,872E-04 |
| 390 | 5,154E-01 | 690 | 3,525E-03 | 990 | 6,786E-02 | 1650 | 1,574E-02 | 3150 | 6,159E-02 | 4650 | 2,055E-04 |
| 400 | 1,524E-01 | 700 | 4,381E-02 | 1000 | 6,441E-02 | 1700 | 1,264E-02 | 3200 | 5,873E-02 | 4700 | 7,701E-05 |
| 410 | 1,277E-02 | 710 | 1,482E-01 | 1010 | 6,074E-02 | 1750 | 1,000E-02 | 3250 | 5,510E-02 | 4750 | 3,602E-05 |
| 420 | 3,343E-04 | 720 | 2,701E-01 | 1020 | 5,634E-02 | 1800 | 9,086E-03 | 3300 | 5,112E-02 | 4800 | 2,360E-05 |
| 430 | < 1,000E-05 | 730 | 3,772E-01 | 1030 | 5,164E-02 | 1850 | 9,759E-03 | 3350 | 4,711E-02 | 4850 | 2,090E-05 |
| 440 | < 1,000E-05 | 740 | 4,822E-01 | 1040 | 4,693E-02 | 1900 | 1,129E-02 | 3400 | 4,352E-02 | 4900 | 1,931E-05 |
| 450 | < 1,000E-05 | 750 | 4,969E-01 | 1050 | 4,254E-02 | 1950 | 1,318E-02 | 3450 | 4,076E-02 | 4950 | 1,251E-05 |
| 460 | < 1,000E-05 | 760 | 4,160E-01 | 1060 | 3,842E-02 | 2000 | 1,507E-02 | 3500 | 3,919E-02 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 3,251E-01 | 1070 | 3,455E-02 | 2050 | 1,693E-02 | 3550 | 3,909E-02 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 3,076E-01 | 1080 | 3,079E-02 | 2100 | 1,983E-02 | 3600 | 4,021E-02 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 3,020E-01 | 1090 | 2,776E-02 | 2150 | 2,320E-02 | 3650 | 4,237E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## UG5

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,913 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (254 nm) | | ≥ | 0,8 |
| $\tau_i$ (308 nm) | | ≥ | 0,94 |
| $\tau_i$ (405 nm) | | ≤ | 0,5 |
| $\tau_i$ (546 nm) | | ≤ | 0,05 |
| $\tau_i$ (633 nm) | | ≤ | 0,05 |
| $\tau_i$ (725 nm) | | ≤ | 0,85 |
| | | | |
| | | | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,55 |
| $n_e$ (546 nm) | | = | 1,54 |
| $n_d$ (587,6 nm) | | = | 1,54 |
| | | | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | 0,8861 | | |
| $B_2$ | 0,4613 | | |
| $B_3$ | 29,7610 | | |
| $C_1$ | 9,024E-03 | µm² | |
| $C_2$ | 8,3379E-03 | µm² | |
| $C_3$ | 3197,045 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 2,85 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 407 |

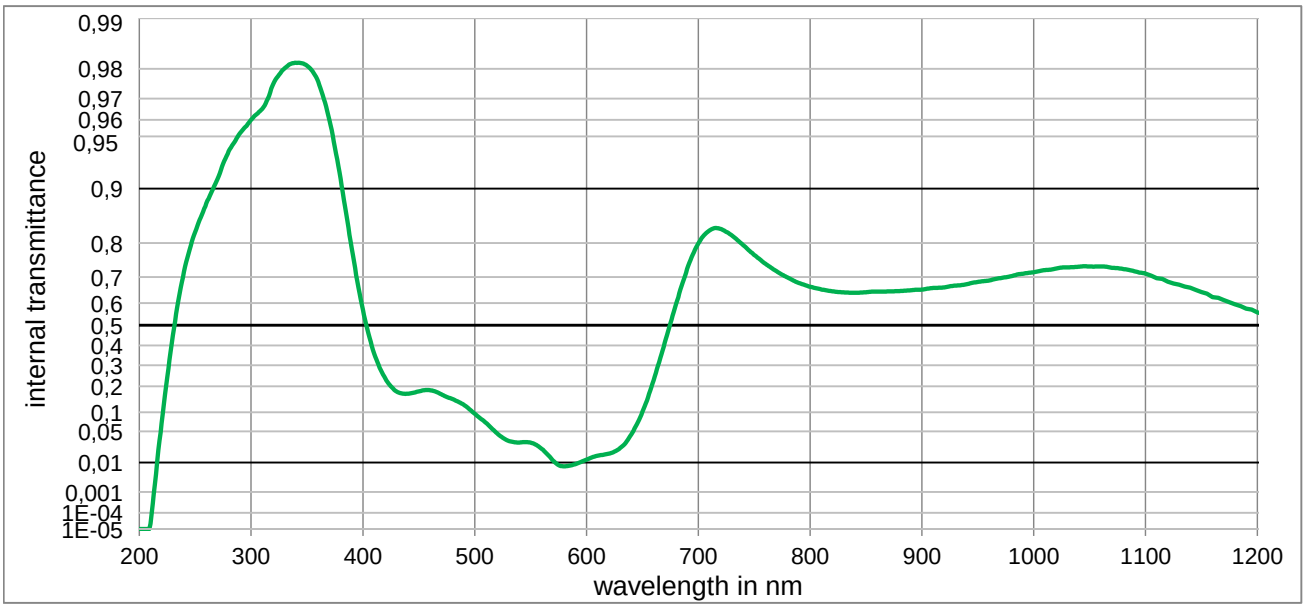
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 462 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 8,1 |
| $\alpha_{(20°C/300°C)}$ | | = | 9,4 |
| | | | |
| | | | |
| | | | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 3 |
| | AR class | = | 2 |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

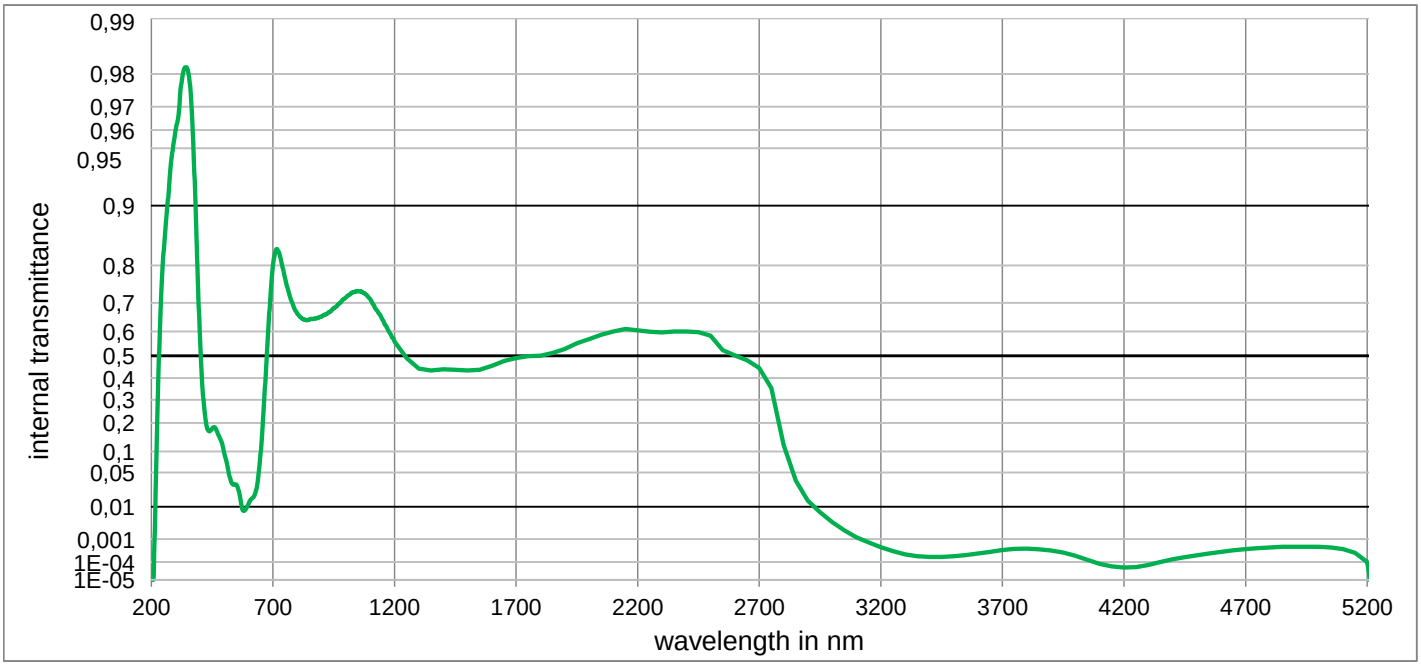
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Bandpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## UG5




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,500E-02 | 800 | 6,650E-01 | 1100 | 7,118E-01 | 2200 | 6,039E-01 | 3700 | 3,581E-04 |
| 210 | 2,2E-05 | 510 | 7,000E-02 | 810 | 6,550E-01 | 1110 | 6,962E-01 | 2250 | 5,992E-01 | 3750 | 4,036E-04 |
| 220 | 6,9E-02 | 520 | 4,600E-02 | 820 | 6,476E-01 | 1120 | 6,834E-01 | 2300 | 5,961E-01 | 3800 | 4,130E-04 |
| 230 | 4,5E-01 | 530 | 3,300E-02 | 830 | 6,436E-01 | 1130 | 6,725E-01 | 2350 | 6,000E-01 | 3850 | 3,873E-04 |
| 240 | 7,2E-01 | 540 | 3,041E-02 | 840 | 6,420E-01 | 1140 | 6,615E-01 | 2400 | 6,000E-01 | 3900 | 3,451E-04 |
| 250 | 8,3E-01 | 550 | 3,015E-02 | 850 | 6,443E-01 | 1150 | 6,444E-01 | 2450 | 5,969E-01 | 3950 | 2,780E-04 |
| 260 | 8,8E-01 | 560 | 2,200E-02 | 860 | 6,463E-01 | 1160 | 6,248E-01 | 2500 | 5,835E-01 | 4000 | 2,000E-04 |
| 270 | 9,1E-01 | 570 | 1,136E-02 | 870 | 6,476E-01 | 1170 | 6,122E-01 | 2550 | 5,246E-01 | 4050 | 1,271E-04 |
| 280 | 9,4E-01 | 580 | 7,810E-03 | 880 | 6,487E-01 | 1180 | 5,947E-01 | 2600 | 5,010E-01 | 4100 | 8,166E-05 |
| 290 | 9,5E-01 | 590 | 9,020E-03 | 890 | 6,518E-01 | 1190 | 5,762E-01 | 2650 | 4,806E-01 | 4150 | 5,902E-05 |
| 300 | 9,6E-01 | 600 | 1,203E-02 | 900 | 6,543E-01 | 1200 | 5,600E-01 | 2700 | 4,461E-01 | 4200 | 5,093E-05 |
| 310 | 9,7E-01 | 610 | 1,514E-02 | 910 | 6,606E-01 | 1250 | 4,893E-01 | 2750 | 3,534E-01 | 4250 | 5,433E-05 |
| 320 | 9,757E-01 | 620 | 1,703E-02 | 920 | 6,628E-01 | 1300 | 4,429E-01 | 2800 | 1,200E-01 | 4300 | 7,000E-05 |
| 330 | 9,802E-01 | 630 | 2,304E-02 | 930 | 6,694E-01 | 1350 | 4,351E-01 | 2850 | 3,622E-02 | 4350 | 1,009E-04 |
| 340 | 9,816E-01 | 640 | 4,400E-02 | 940 | 6,745E-01 | 1400 | 4,400E-01 | 2900 | 1,396E-02 | 4400 | 1,371E-04 |
| 350 | 9,809E-01 | 650 | 1,010E-01 | 950 | 6,826E-01 | 1450 | 4,374E-01 | 2950 | 7,228E-03 | 4450 | 1,726E-04 |
| 360 | 9,761E-01 | 660 | 2,270E-01 | 960 | 6,876E-01 | 1500 | 4,343E-01 | 3000 | 3,784E-03 | 4500 | 2,113E-04 |
| 370 | 9,600E-01 | 670 | 4,140E-01 | 970 | 6,962E-01 | 1550 | 4,374E-01 | 3050 | 2,037E-03 | 4550 | 2,570E-04 |
| 380 | 9,120E-01 | 680 | 5,950E-01 | 980 | 7,030E-01 | 1600 | 4,555E-01 | 3100 | 1,169E-03 | 4600 | 3,000E-04 |
| 390 | 7,870E-01 | 690 | 7,270E-01 | 990 | 7,112E-01 | 1650 | 4,767E-01 | 3150 | 7,430E-04 | 4650 | 3,516E-04 |
| 400 | 5,700E-01 | 700 | 7,990E-01 | 1000 | 7,164E-01 | 1700 | 4,900E-01 | 3200 | 4,775E-04 | 4700 | 4,000E-04 |
| 410 | 3,600E-01 | 710 | 8,290E-01 | 1010 | 7,232E-01 | 1750 | 4,979E-01 | 3250 | 3,236E-04 | 4750 | 4,315E-04 |
| 420 | 2,360E-01 | 720 | 8,320E-01 | 1020 | 7,278E-01 | 1800 | 5,000E-01 | 3300 | 2,296E-04 | 4800 | 4,688E-04 |
| 430 | 1,780E-01 | 730 | 8,180E-01 | 1030 | 7,317E-01 | 1850 | 5,128E-01 | 3350 | 1,910E-04 | 4850 | 4,909E-04 |
| 440 | 1,680E-01 | 740 | 7,950E-01 | 1040 | 7,338E-01 | 1900 | 5,293E-01 | 3400 | 1,758E-04 | 4900 | 5,000E-04 |
| 450 | 1,780E-01 | 750 | 7,690E-01 | 1050 | 7,344E-01 | 1950 | 5,529E-01 | 3450 | 1,758E-04 | 4950 | 5,000E-04 |
| 460 | 1,830E-01 | 760 | 7,430E-01 | 1060 | 7,347E-01 | 2000 | 5,700E-01 | 3500 | 1,910E-04 | 5000 | 4,955E-04 |
| 470 | 1,660E-01 | 770 | 7,190E-01 | 1070 | 7,305E-01 | 2050 | 5,874E-01 | 3550 | 2,133E-04 | 5050 | 4,645E-04 |
| 480 | 1,470E-01 | 780 | 6,980E-01 | 1080 | 7,267E-01 | 2100 | 6,000E-01 | 3600 | 2,547E-04 | 5100 | 4,000E-04 |
| 490 | 1,260E-01 | 790 | 6,789E-01 | 1090 | 7,194E-01 | 2150 | 6,094E-01 | 3650 | 3,000E-04 | 5150 | 2,742E-04 |

# Data Sheet

## UG11

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,908 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (254 nm) | ≥ | 0,06 | |
| $\tau_i$ (334 nm) | ≥ | 0,9 | |
| $\tau_i$ (405 nm) | ≤ | 0,001 | |
| $\tau_i$ (694 nm) | ≤ | 0,26 | |
| $\tau_i$ (725 nm) | ≤ | 0,32 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,57 | |
| $n_e$ (546 nm) | = | 1,57 | |
| $n_d$ (587,6 nm) | = | 1,56 | |
| **Sellmeier coefficients** | | | |
| valid from 270 nm to 600 nm | | | |
| $B_1$ | 1,3960 | | |
| $B_2$ | 0,0097 | | |
| $B_3$ | 0,5658 | | |
| $C_1$ | 9,230E-03 | µm² | |
| $C_2$ | 4,4000E-02 | µm² | |
| $C_3$ | 96,000 | µm² | |
| **Internal quality** | | | |
| Bubble class | 2 | | |

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

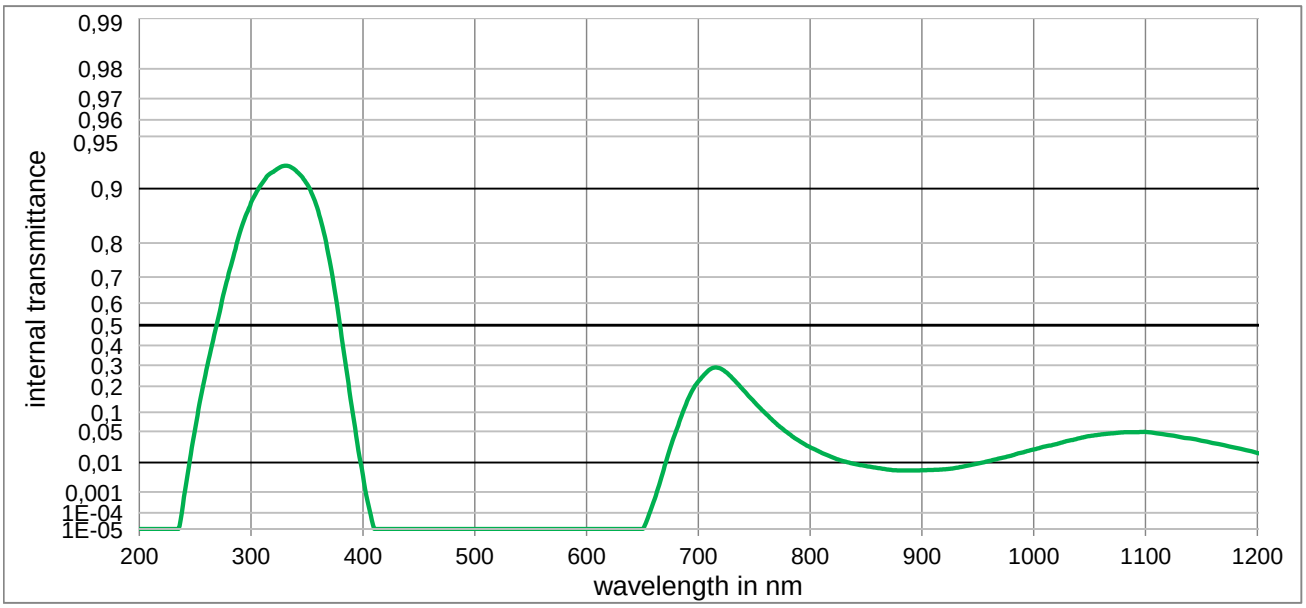
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 545 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | = | 7,8 | |
| $\alpha_{(20°C/300°C)}$ | = | 9,0 | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| FR class | = | 0 | |
| SR class | = | 3 | |
| AR class | = | 2.2 | |
| **Resistance against humidity** | | | |
| Sensitive glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

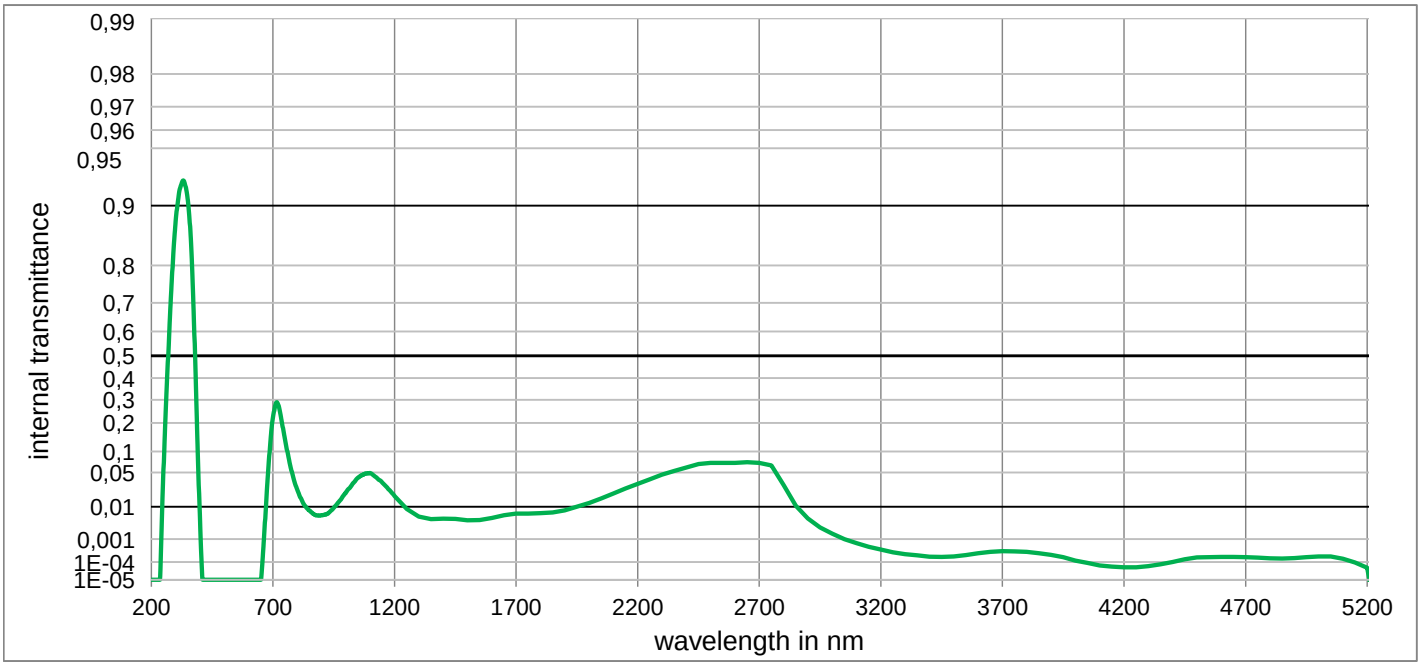
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Bandpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## UG11




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 2,400E-02 | 1100 | 4,897E-02 | 2200 | 3,160E-02 | 3700 | 3,206E-04 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 1,800E-02 | 1110 | 4,608E-02 | 2250 | 3,845E-02 | 3750 | 3,177E-04 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 1,382E-02 | 1120 | 4,300E-02 | 2300 | 4,600E-02 | 3800 | 3,000E-04 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 1,088E-02 | 1130 | 3,948E-02 | 2350 | 5,309E-02 | 3850 | 2,594E-04 |
| 240 | 6,1E-04 | 540 | < 1,000E-05 | 840 | 9,121E-03 | 1140 | 3,666E-02 | 2400 | 6,000E-02 | 3900 | 2,213E-04 |
| 250 | 5,6E-02 | 550 | < 1,000E-05 | 850 | 7,965E-03 | 1150 | 3,325E-02 | 2450 | 6,776E-02 | 3950 | 1,710E-04 |
| 260 | 2,8E-01 | 560 | < 1,000E-05 | 860 | 7,014E-03 | 1160 | 2,970E-02 | 2500 | 7,000E-02 | 4000 | 1,180E-04 |
| 270 | 5,2E-01 | 570 | < 1,000E-05 | 870 | 6,255E-03 | 1170 | 2,691E-02 | 2550 | 7,000E-02 | 4050 | 8,954E-05 |
| 280 | 7,1E-01 | 580 | < 1,000E-05 | 880 | 5,892E-03 | 1180 | 2,354E-02 | 2600 | 7,000E-02 | 4100 | 6,653E-05 |
| 290 | 8,3E-01 | 590 | < 1,000E-05 | 890 | 5,834E-03 | 1190 | 2,064E-02 | 2650 | 7,161E-02 | 4150 | 5,741E-05 |
| 300 | 8,8E-01 | 600 | < 1,000E-05 | 900 | 5,948E-03 | 1200 | 1,775E-02 | 2700 | 7,000E-02 | 4200 | 5,236E-05 |
| 310 | 9,1E-01 | 610 | < 1,000E-05 | 910 | 6,114E-03 | 1250 | 8,800E-03 | 2750 | 6,427E-02 | 4250 | 5,383E-05 |
| 320 | 9,200E-01 | 620 | < 1,000E-05 | 920 | 6,368E-03 | 1300 | 5,470E-03 | 2800 | 3,000E-02 | 4300 | 6,067E-05 |
| 330 | 9,260E-01 | 630 | < 1,000E-05 | 930 | 7,000E-03 | 1350 | 4,590E-03 | 2850 | 1,057E-02 | 4350 | 7,621E-05 |
| 340 | 9,210E-01 | 640 | < 1,000E-05 | 940 | 8,090E-03 | 1400 | 4,770E-03 | 2900 | 4,819E-03 | 4400 | 1,000E-04 |
| 350 | 9,060E-01 | 650 | < 1,000E-05 | 950 | 9,390E-03 | 1450 | 4,650E-03 | 2950 | 2,547E-03 | 4450 | 1,384E-04 |
| 360 | 8,660E-01 | 660 | 3,631E-04 | 960 | 1,100E-02 | 1500 | 4,270E-03 | 3000 | 1,589E-03 | 4500 | 1,663E-04 |
| 370 | 7,560E-01 | 670 | 8,128E-03 | 970 | 1,300E-02 | 1550 | 4,340E-03 | 3050 | 1,000E-03 | 4550 | 1,742E-04 |
| 380 | 4,820E-01 | 680 | 5,000E-02 | 980 | 1,520E-02 | 1600 | 5,000E-03 | 3100 | 6,966E-04 | 4600 | 1,766E-04 |
| 390 | 1,200E-01 | 690 | 1,380E-01 | 990 | 1,825E-02 | 1650 | 5,970E-03 | 3150 | 5,000E-04 | 4650 | 1,750E-04 |
| 400 | 3,999E-03 | 700 | 2,220E-01 | 1000 | 2,132E-02 | 1700 | 6,600E-03 | 3200 | 3,750E-04 | 4700 | 1,710E-04 |
| 410 | 1,047E-05 | 710 | 2,780E-01 | 1010 | 2,498E-02 | 1750 | 6,660E-03 | 3250 | 2,897E-04 | 4750 | 1,633E-04 |
| 420 | < 1,000E-05 | 720 | 2,830E-01 | 1020 | 2,809E-02 | 1800 | 6,790E-03 | 3300 | 2,360E-04 | 4800 | 1,503E-04 |
| 430 | < 1,000E-05 | 730 | 2,400E-01 | 1030 | 3,263E-02 | 1850 | 7,160E-03 | 3350 | 2,075E-04 | 4850 | 1,496E-04 |
| 440 | < 1,000E-05 | 740 | 1,850E-01 | 1040 | 3,673E-02 | 1900 | 8,040E-03 | 3400 | 1,824E-04 | 4900 | 1,560E-04 |
| 450 | < 1,000E-05 | 750 | 1,360E-01 | 1050 | 4,100E-02 | 1950 | 1,000E-02 | 3450 | 1,758E-04 | 4950 | 1,726E-04 |
| 460 | < 1,000E-05 | 760 | 9,700E-02 | 1060 | 4,375E-02 | 2000 | 1,238E-02 | 3500 | 1,875E-04 | 5000 | 1,866E-04 |
| 470 | < 1,000E-05 | 770 | 6,700E-02 | 1070 | 4,599E-02 | 2050 | 1,577E-02 | 3550 | 2,133E-04 | 5050 | 1,875E-04 |
| 480 | < 1,000E-05 | 780 | 4,700E-02 | 1080 | 4,800E-02 | 2100 | 2,029E-02 | 3600 | 2,594E-04 | 5100 | 1,435E-04 |
| 490 | < 1,000E-05 | 790 | 3,300E-02 | 1090 | 4,828E-02 | 2150 | 2,582E-02 | 3650 | 3,000E-04 | 5150 | 9,376E-05 |

# Data Sheet

## BG36

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,877 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≥ | 0,9 |
| $\tau_i$ (450 nm) | | ≤ | 0,42 |
| $\tau_i$ (650 nm) | | ≥ | 0,9 |
| $\tau_i$ (800 nm) | | ≤ | 0,01 |
| **Refractive indices** | | | |
| $n_d$ (587,6 nm) | | = | 1,69 |
| **Sellmeier coefficients** | | | |
| on request | | | |
| **Internal quality** | | | |
| Bubble class | | | 3 |

| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 1,00 mm |
| **Density** | | | |
| | ρ | = | 3,59 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 701 |

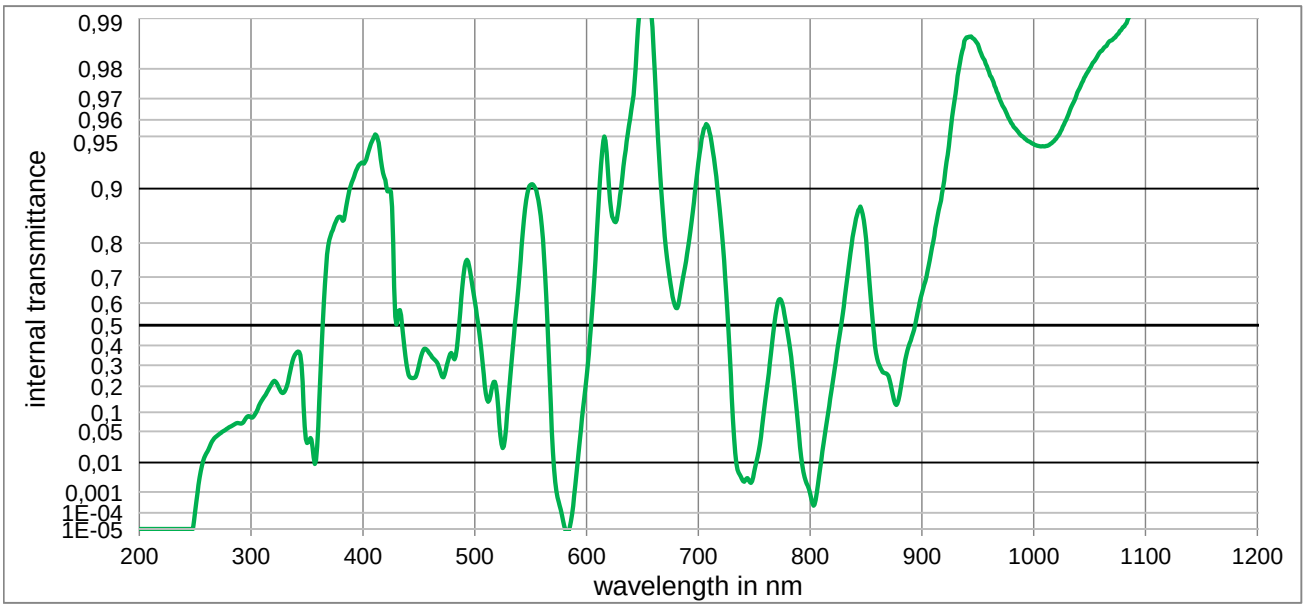
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 657 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 6,1 |
| $\alpha_{(20°C/300°C)}$ | | = | 7,2 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 52.2 |
| | AR class | = | 1.2 |
| **Resistance against humidity** | | | |
| Delicate glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,344 | 0,395 | 0,429 |
| | y | 0,327 | 0,356 | 0,370 |
| | Y | 39,5 | 29,0 | 23,5 |
| | $\lambda_d$ | 622 nm | 591 nm | 590 nm |
| | $P_e$ | 0,082 | 0,305 | 0,437 |
| Illuminant A | x | 0,495 | 0,534 | 0,557 |
| | y | 0,387 | 0,390 | 0,389 |
| | Y | 41,4 | 32,2 | 26,9 |
| | $\lambda_d$ | 628 nm | 600 nm | 599 nm |
| | $P_e$ | 0,185 | 0,478 | 0,628 |

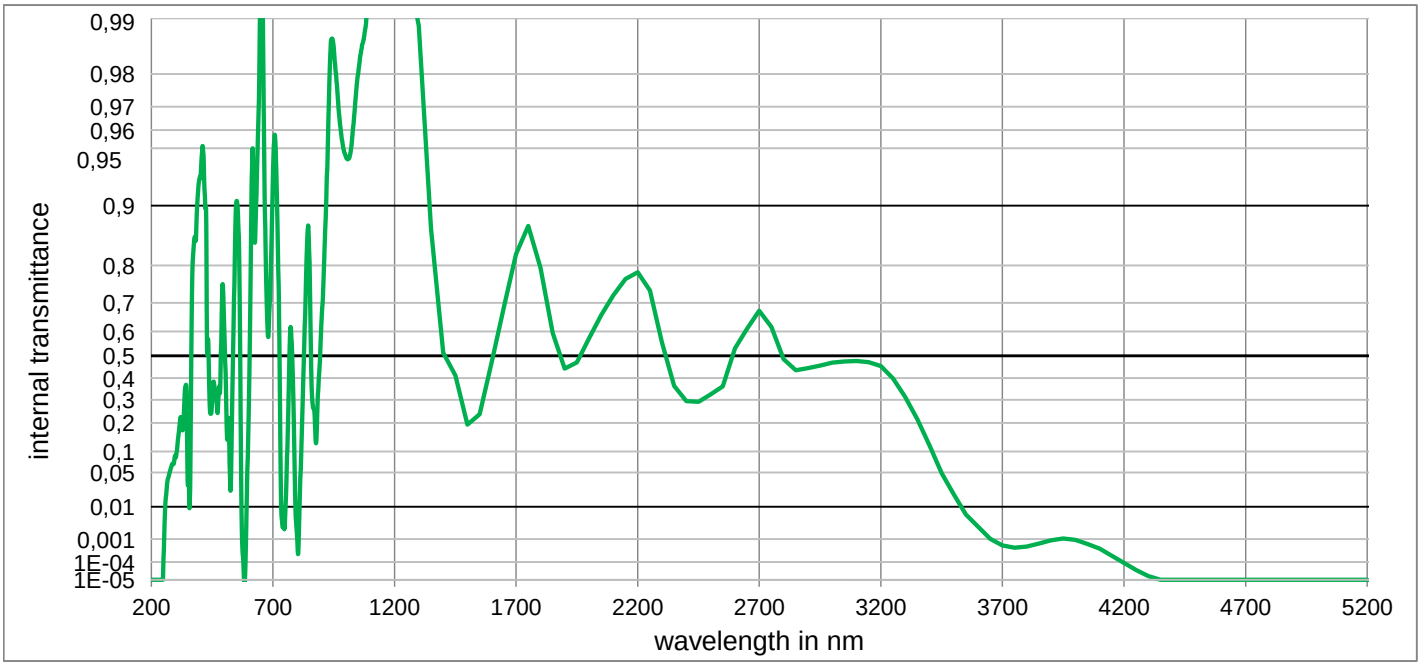
| Notes |
|---|
| |
| Ionically colored glass |
| Multi bandpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## BG36




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 6,084E-01 | 800 | 8,615E-04 | 1100 | 9,947E-01 | 2200 | 7,840E-01 | 3700 | 5,636E-04 |
| 210 | < 1,0E-05 | 510 | 1,685E-01 | 810 | 1,212E-02 | 1110 | 9,956E-01 | 2250 | 7,370E-01 | 3750 | 4,498E-04 |
| 220 | < 1,0E-05 | 520 | 1,625E-01 | 820 | 2,111E-01 | 1120 | 9,965E-01 | 2300 | 5,570E-01 | 3800 | 5,035E-04 |
| 230 | < 1,0E-05 | 530 | 1,386E-01 | 830 | 5,842E-01 | 1130 | 9,973E-01 | 2350 | 3,641E-01 | 3850 | 6,764E-04 |
| 240 | < 1,0E-05 | 540 | 7,084E-01 | 840 | 8,398E-01 | 1140 | 9,979E-01 | 2400 | 2,940E-01 | 3900 | 8,872E-04 |
| 250 | 1,3E-04 | 550 | 9,047E-01 | 850 | 8,090E-01 | 1150 | 9,981E-01 | 2450 | 2,914E-01 | 3950 | 1,054E-03 |
| 260 | 1,7E-02 | 560 | 8,367E-01 | 860 | 3,330E-01 | 1160 | 9,979E-01 | 2500 | 3,250E-01 | 4000 | 9,311E-04 |
| 270 | 4,2E-02 | 570 | 1,873E-02 | 870 | 2,481E-01 | 1170 | 9,974E-01 | 2550 | 3,616E-01 | 4050 | 6,485E-04 |
| 280 | 5,8E-02 | 580 | 1,610E-05 | 880 | 1,625E-01 | 1180 | 9,966E-01 | 2600 | 5,320E-01 | 4100 | 4,112E-04 |
| 290 | 6,8E-02 | 590 | 1,816E-03 | 890 | 4,256E-01 | 1190 | 9,956E-01 | 2650 | 6,110E-01 | 4150 | 2,000E-04 |
| 300 | 8,4E-02 | 600 | 2,413E-01 | 900 | 6,394E-01 | 1200 | 9,946E-01 | 2700 | 6,740E-01 | 4200 | 8,913E-05 |
| 310 | 1,4E-01 | 610 | 8,512E-01 | 910 | 8,023E-01 | 1250 | 9,950E-01 | 2750 | 6,170E-01 | 4250 | 3,746E-05 |
| 320 | 2,223E-01 | 620 | 9,037E-01 | 920 | 9,102E-01 | 1300 | 9,890E-01 | 2800 | 4,856E-01 | 4300 | 1,710E-05 |
| 330 | 1,781E-01 | 630 | 8,899E-01 | 930 | 9,718E-01 | 1350 | 8,689E-01 | 2850 | 4,360E-01 | 4350 | < 1,000E-05 |
| 340 | 3,601E-01 | 640 | 9,649E-01 | 940 | 9,870E-01 | 1400 | 5,130E-01 | 2900 | 4,455E-01 | 4400 | < 1,000E-05 |
| 350 | 2,978E-02 | 650 | 9,962E-01 | 950 | 9,857E-01 | 1450 | 4,112E-01 | 2950 | 4,570E-01 | 4450 | < 1,000E-05 |
| 360 | 6,104E-02 | 660 | 9,844E-01 | 960 | 9,792E-01 | 1500 | 1,930E-01 | 3000 | 4,695E-01 | 4500 | < 1,000E-05 |
| 370 | 8,080E-01 | 670 | 8,158E-01 | 970 | 9,692E-01 | 1550 | 2,365E-01 | 3050 | 4,748E-01 | 4550 | < 1,000E-05 |
| 380 | 8,558E-01 | 680 | 5,792E-01 | 980 | 9,582E-01 | 1600 | 4,754E-01 | 3100 | 4,767E-01 | 4600 | < 1,000E-05 |
| 390 | 9,077E-01 | 690 | 7,712E-01 | 990 | 9,499E-01 | 1650 | 6,889E-01 | 3150 | 4,720E-01 | 4650 | < 1,000E-05 |
| 400 | 9,286E-01 | 700 | 9,289E-01 | 1000 | 9,445E-01 | 1700 | 8,240E-01 | 3200 | 4,547E-01 | 4700 | < 1,000E-05 |
| 410 | 9,496E-01 | 710 | 9,529E-01 | 1010 | 9,429E-01 | 1750 | 8,730E-01 | 3250 | 3,980E-01 | 4750 | < 1,000E-05 |
| 420 | 9,107E-01 | 720 | 8,502E-01 | 1020 | 9,484E-01 | 1800 | 7,951E-01 | 3300 | 3,137E-01 | 4800 | < 1,000E-05 |
| 430 | 5,033E-01 | 730 | 1,533E-01 | 1030 | 9,614E-01 | 1850 | 5,949E-01 | 3350 | 2,154E-01 | 4850 | < 1,000E-05 |
| 440 | 2,722E-01 | 740 | 2,600E-03 | 1040 | 9,731E-01 | 1900 | 4,433E-01 | 3400 | 1,186E-01 | 4900 | < 1,000E-05 |
| 450 | 2,957E-01 | 750 | 5,260E-03 | 1050 | 9,801E-01 | 1950 | 4,709E-01 | 3450 | 4,861E-02 | 4950 | < 1,000E-05 |
| 460 | 3,560E-01 | 760 | 1,460E-01 | 1060 | 9,843E-01 | 2000 | 5,741E-01 | 3500 | 1,952E-02 | 5000 | < 1,000E-05 |
| 470 | 2,574E-01 | 770 | 5,782E-01 | 1070 | 9,865E-01 | 2050 | 6,600E-01 | 3550 | 6,251E-03 | 5050 | < 1,000E-05 |
| 480 | 3,513E-01 | 780 | 4,586E-01 | 1080 | 9,887E-01 | 2100 | 7,230E-01 | 3600 | 2,675E-03 | 5100 | < 1,000E-05 |
| 490 | 7,056E-01 | 790 | 4,187E-02 | 1090 | 9,918E-01 | 2150 | 7,680E-01 | 3650 | 1,009E-03 | 5150 | < 1,000E-05 |

# Data Sheet

## S7005

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,908 |
| **Spectral values guaranteed (d = 2 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 365 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 330 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,99) | = 520 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,56 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | - |

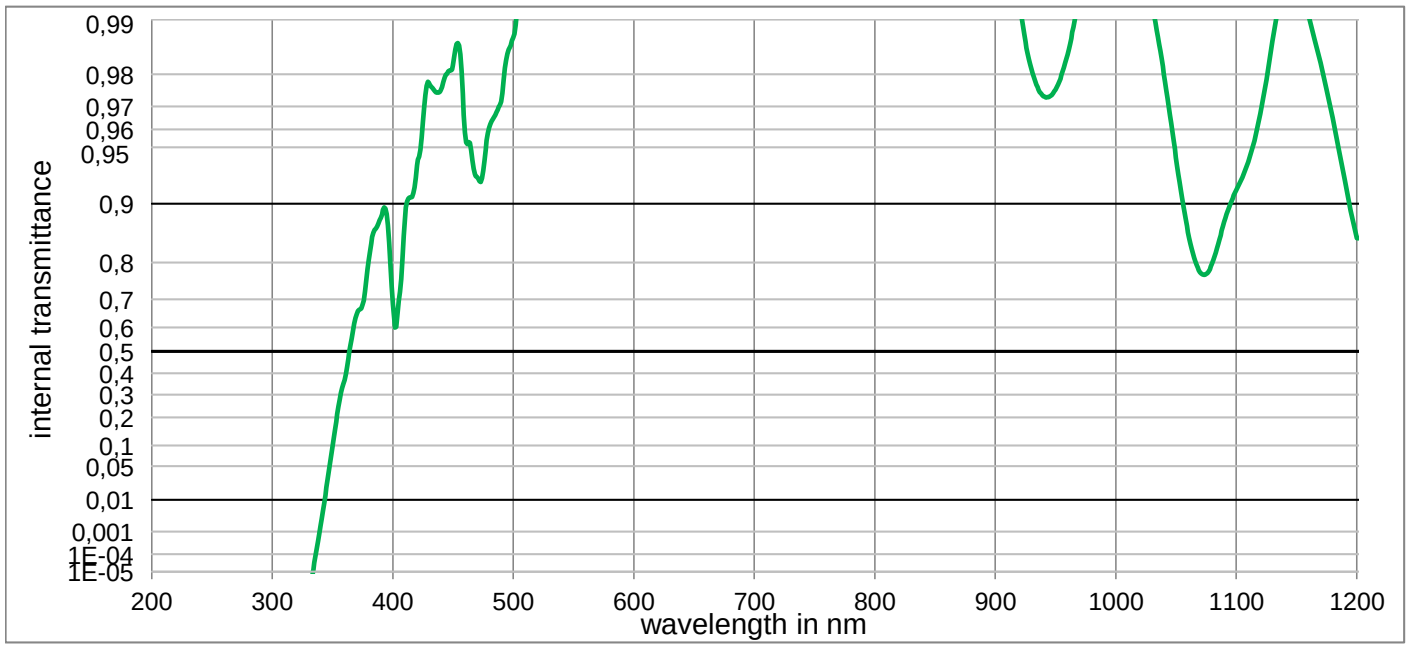
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 2,00 mm |
| **Density** | |
| ρ | = 2,88 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | |

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

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

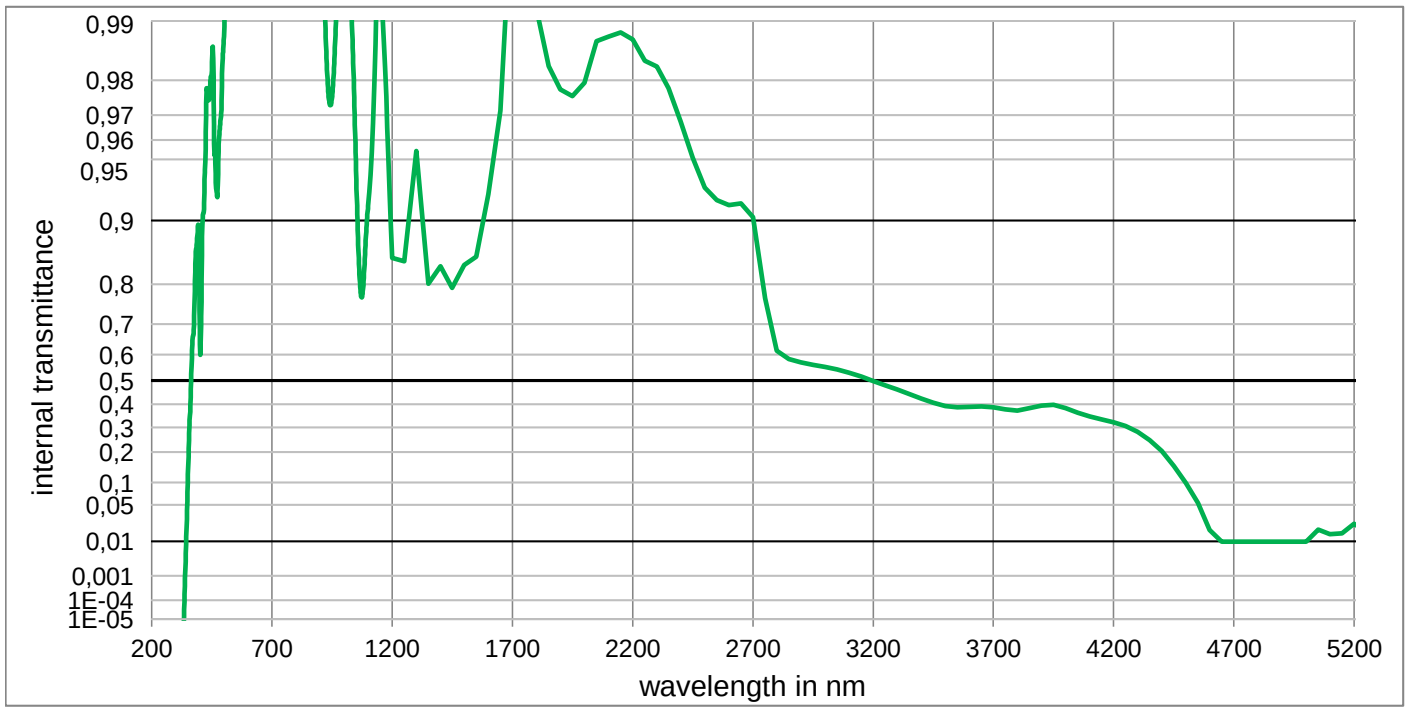
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,314 | 0,316 | 0,317 |
| | y | 0,331 | 0,333 | 0,335 |
| | Y | 90,6 | 90,4 | 90,2 |
| | $\lambda_d$ | 572 nm | 572 nm | 572 nm |
| | $P_e$ | 0,010 | 0,020 | 0,030 |
| Illuminant A | x | 0,449 | 0,450 | 0,451 |
| | y | 0,408 | 0,409 | 0,410 |
| | Y | 90,7 | 90,6 | 90,4 |
| | $\lambda_d$ | 582 nm | 582 nm | 582 nm |
| | $P_e$ | 0,014 | 0,028 | 0,042 |

| Notes |
|---|
| |
| Ionically colored glass |
| |
| Samarium doped |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S7005




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,874E-01 | 800 | 9,984E-01 | 1100 | 9,151E-01 | 2200 | 9,875E-01 | 3700 | 3,872E-01 |
| 210 | < 1,0E-05 | 510 | 9,967E-01 | 810 | 9,987E-01 | 1110 | 9,401E-01 | 2250 | 9,841E-01 | 3750 | 3,775E-01 |
| 220 | < 1,0E-05 | 520 | 9,980E-01 | 820 | 9,989E-01 | 1120 | 9,671E-01 | 2300 | 9,829E-01 | 3800 | 3,725E-01 |
| 230 | < 1,0E-05 | 530 | 9,963E-01 | 830 | 9,989E-01 | 1130 | 9,868E-01 | 2350 | 9,781E-01 | 3850 | 3,825E-01 |
| 240 | < 1,0E-05 | 540 | 9,981E-01 | 840 | 9,981E-01 | 1140 | 9,942E-01 | 2400 | 9,677E-01 | 3900 | 3,944E-01 |
| 250 | < 1,0E-05 | 550 | 9,975E-01 | 850 | 9,983E-01 | 1150 | 9,941E-01 | 2450 | 9,510E-01 | 3950 | 3,970E-01 |
| 260 | < 1,0E-05 | 560 | 9,963E-01 | 860 | 9,985E-01 | 1160 | 9,905E-01 | 2500 | 9,310E-01 | 4000 | 3,839E-01 |
| 270 | < 1,0E-05 | 570 | 9,980E-01 | 870 | 9,989E-01 | 1170 | 9,826E-01 | 2550 | 9,205E-01 | 4050 | 3,641E-01 |
| 280 | < 1,0E-05 | 580 | 9,999E-01 | 880 | 9,993E-01 | 1180 | 9,653E-01 | 2600 | 9,157E-01 | 4100 | 3,467E-01 |
| 290 | < 1,0E-05 | 590 | 9,968E-01 | 890 | 9,985E-01 | 1190 | 9,252E-01 | 2650 | 9,175E-01 | 4150 | 3,344E-01 |
| 300 | < 1,0E-05 | 600 | 9,969E-01 | 900 | 9,977E-01 | 1200 | 8,493E-01 | 2700 | 9,039E-01 | 4200 | 3,220E-01 |
| 310 | < 1,0E-05 | 610 | 9,970E-01 | 910 | 9,981E-01 | 1250 | 8,438E-01 | 2750 | 7,688E-01 | 4250 | 3,065E-01 |
| 320 | < 1,000E-05 | 620 | 9,971E-01 | 920 | 9,920E-01 | 1300 | 9,545E-01 | 2800 | 6,136E-01 | 4300 | 2,805E-01 |
| 330 | < 1,000E-05 | 630 | 9,973E-01 | 930 | 9,813E-01 | 1350 | 8,013E-01 | 2850 | 5,831E-01 | 4350 | 2,469E-01 |
| 340 | 1,598E-03 | 640 | 9,973E-01 | 940 | 9,737E-01 | 1400 | 8,351E-01 | 2900 | 5,707E-01 | 4400 | 2,034E-01 |
| 350 | 9,824E-02 | 650 | 9,975E-01 | 950 | 9,758E-01 | 1450 | 7,926E-01 | 2950 | 5,612E-01 | 4450 | 1,508E-01 |
| 360 | 3,675E-01 | 660 | 9,979E-01 | 960 | 9,844E-01 | 1500 | 8,367E-01 | 3000 | 5,532E-01 | 4500 | 9,816E-02 |
| 370 | 6,496E-01 | 670 | 9,975E-01 | 970 | 9,930E-01 | 1550 | 8,509E-01 | 3050 | 5,439E-01 | 4550 | 5,334E-02 |
| 380 | 8,064E-01 | 680 | 9,978E-01 | 980 | 9,984E-01 | 1600 | 9,254E-01 | 3100 | 5,313E-01 | 4600 | 1,783E-02 |
| 390 | 8,817E-01 | 690 | 9,982E-01 | 990 | 9,973E-01 | 1650 | 9,715E-01 | 3150 | 5,159E-01 | 4650 | 9,925E-03 |
| 400 | 6,832E-01 | 700 | 9,983E-01 | 1000 | 9,974E-01 | 1700 | 9,979E-01 | 3200 | 4,984E-01 | 4700 | 9,925E-03 |
| 410 | 8,806E-01 | 710 | 9,982E-01 | 1010 | 9,994E-01 | 1750 | 9,968E-01 | 3250 | 4,804E-01 | 4750 | 9,925E-03 |
| 420 | 9,374E-01 | 720 | 9,985E-01 | 1020 | 9,969E-01 | 1800 | 9,912E-01 | 3300 | 4,624E-01 | 4800 | 9,925E-03 |
| 430 | 9,777E-01 | 730 | 9,986E-01 | 1030 | 9,921E-01 | 1850 | 9,831E-01 | 3350 | 4,439E-01 | 4850 | 9,925E-03 |
| 440 | 9,756E-01 | 740 | 9,982E-01 | 1040 | 9,801E-01 | 1900 | 9,778E-01 | 3400 | 4,247E-01 | 4900 | 9,925E-03 |
| 450 | 9,821E-01 | 750 | 9,987E-01 | 1050 | 9,434E-01 | 1950 | 9,760E-01 | 3450 | 4,063E-01 | 4950 | 9,925E-03 |
| 460 | 9,584E-01 | 760 | 9,978E-01 | 1060 | 8,591E-01 | 2000 | 9,794E-01 | 3500 | 3,930E-01 | 5000 | 9,925E-03 |
| 470 | 9,279E-01 | 770 | 9,989E-01 | 1070 | 7,772E-01 | 2050 | 9,873E-01 | 3550 | 3,874E-01 | 5050 | 1,806E-02 |
| 480 | 9,607E-01 | 780 | 9,988E-01 | 1080 | 7,978E-01 | 2100 | 9,880E-01 | 3600 | 3,887E-01 | 5100 | 1,447E-02 |
| 490 | 9,718E-01 | 790 | 9,983E-01 | 1090 | 8,752E-01 | 2150 | 9,885E-01 | 3650 | 3,896E-01 | 5150 | 1,512E-02 |

# Data Sheet

## S7010N

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

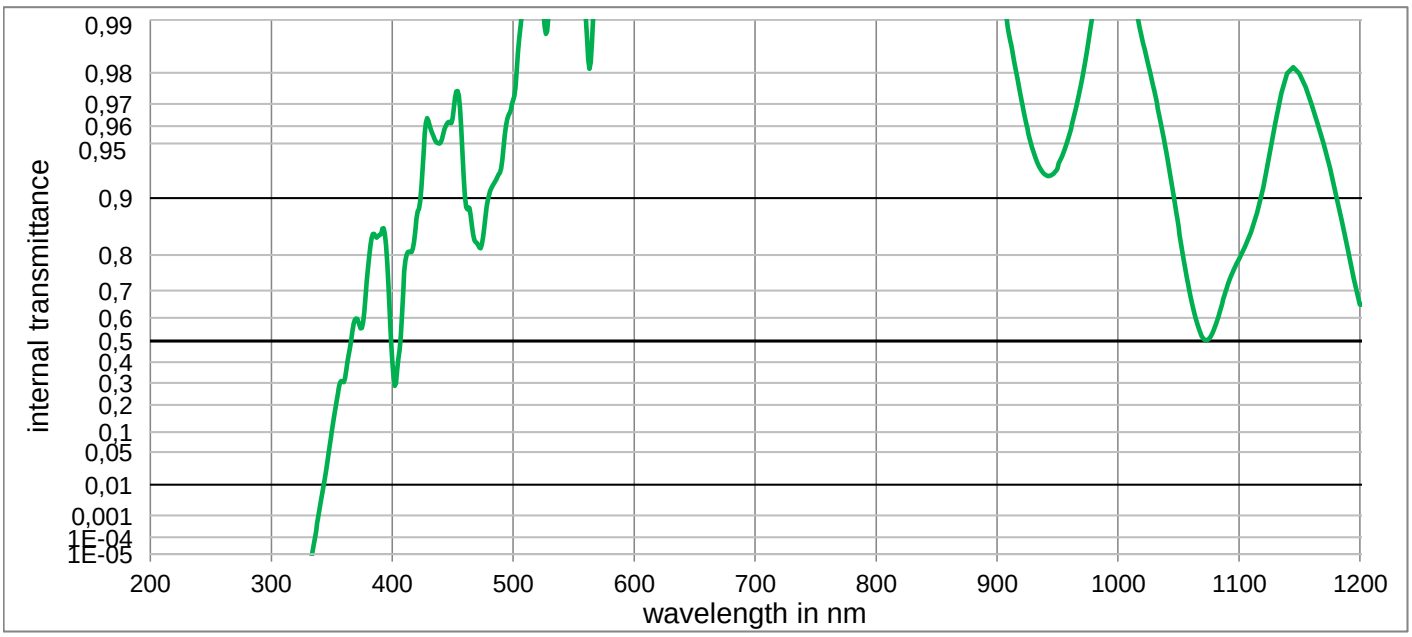
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 2,00 mm |
| **Density** | | |
| ρ | = | 2,88 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | | |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 1.2 |
| AR class | = | 1.0 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

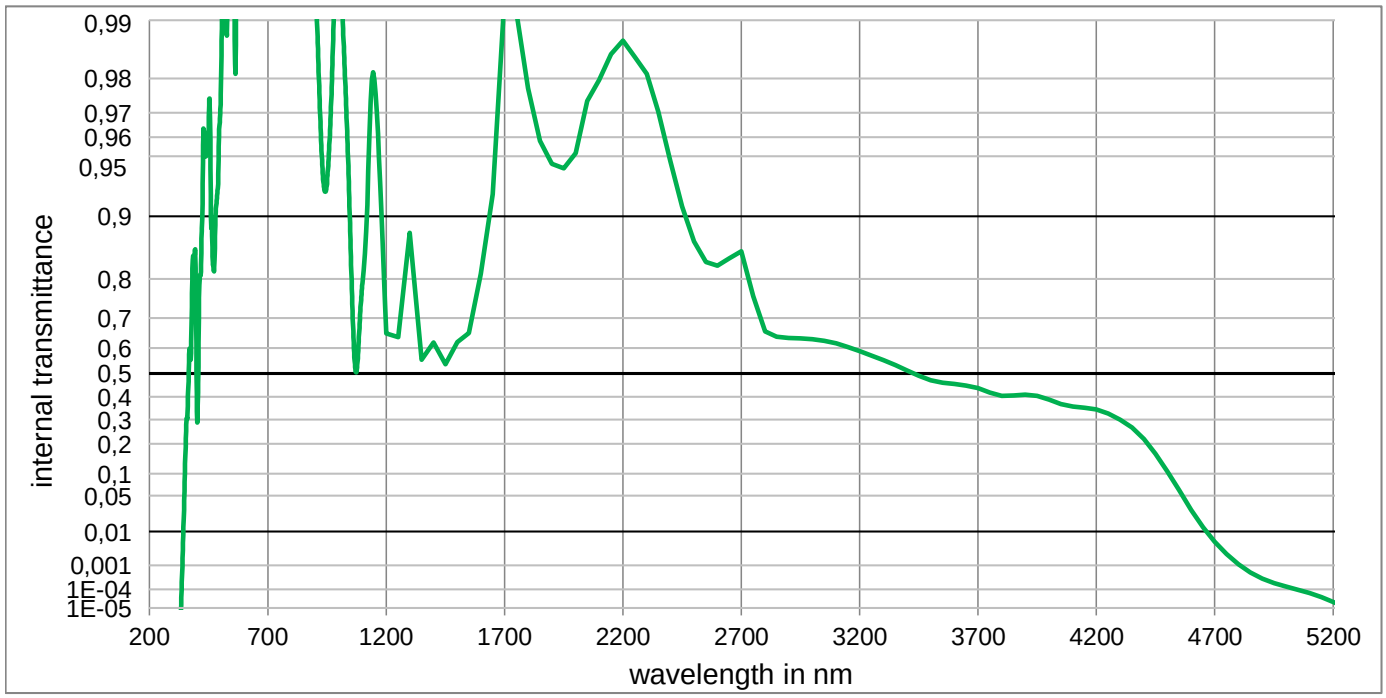
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,316 | 0,319 | 0,322 |
| | y | 0,334 | 0,338 | 0,343 |
| | Y | 90,3 | 89,9 | 89,4 |
| | $\lambda_d$ | 572,3 | 572,4 | 572,5 |
| | $P_e$ | 0,023 | 0,044 | 0,065 |
| Illuminant A | x | 0,450 | 0,452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

| Notes |
|---|
| Ionically colored glass |
| samarium doped |
| DIN 58131 |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S7010N




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,713E-01 | 800 | 9,992E-01 | 1100 | 7,904E-01 | 2200 | 9,873E-01 | 3700 | 4,375E-01 |
| 210 | < 1,0E-05 | 510 | 9,947E-01 | 810 | 9,995E-01 | 1110 | 8,478E-01 | 2250 | 9,845E-01 | 3750 | 4,176E-01 |
| 220 | < 1,0E-05 | 520 | 9,973E-01 | 820 | 9,991E-01 | 1120 | 9,123E-01 | 2300 | 9,811E-01 | 3800 | 4,038E-01 |
| 230 | < 1,0E-05 | 530 | 9,927E-01 | 830 | 9,993E-01 | 1130 | 9,613E-01 | 2350 | 9,704E-01 | 3850 | 4,062E-01 |
| 240 | < 1,0E-05 | 540 | 9,965E-01 | 840 | 9,989E-01 | 1140 | 9,799E-01 | 2400 | 9,475E-01 | 3900 | 4,102E-01 |
| 250 | < 1,0E-05 | 550 | 9,949E-01 | 850 | 9,986E-01 | 1150 | 9,797E-01 | 2450 | 9,106E-01 | 3950 | 4,048E-01 |
| 260 | < 1,0E-05 | 560 | 9,903E-01 | 860 | 9,977E-01 | 1160 | 9,701E-01 | 2500 | 8,676E-01 | 4000 | 3,874E-01 |
| 270 | < 1,0E-05 | 570 | 9,952E-01 | 870 | 9,993E-01 | 1170 | 9,496E-01 | 2550 | 8,334E-01 | 4050 | 3,685E-01 |
| 280 | < 1,0E-05 | 580 | 9,995E-01 | 880 | 9,989E-01 | 1180 | 9,061E-01 | 2600 | 8,267E-01 | 4100 | 3,564E-01 |
| 290 | < 1,0E-05 | 590 | 9,999E-01 | 890 | 9,976E-01 | 1190 | 8,117E-01 | 2650 | 8,399E-01 | 4150 | 3,516E-01 |
| 300 | < 1,0E-05 | 600 | 9,970E-01 | 900 | 9,949E-01 | 1200 | 6,513E-01 | 2700 | 8,516E-01 | 4200 | 3,436E-01 |
| 310 | < 1,0E-05 | 610 | 9,974E-01 | 910 | 9,879E-01 | 1250 | 6,393E-01 | 2750 | 7,606E-01 | 4250 | 3,254E-01 |
| 320 | < 1,000E-05 | 620 | 9,975E-01 | 920 | 9,718E-01 | 1300 | 8,795E-01 | 2800 | 6,575E-01 | 4300 | 2,994E-01 |
| 330 | < 1,000E-05 | 630 | 9,977E-01 | 930 | 9,450E-01 | 1350 | 5,560E-01 | 2850 | 6,406E-01 | 4350 | 2,655E-01 |
| 340 | 1,751E-03 | 640 | 9,979E-01 | 940 | 9,254E-01 | 1400 | 6,197E-01 | 2900 | 6,365E-01 | 4400 | 2,188E-01 |
| 350 | 1,027E-01 | 650 | 9,981E-01 | 950 | 9,309E-01 | 1450 | 5,378E-01 | 2950 | 6,345E-01 | 4450 | 1,625E-01 |
| 360 | 3,035E-01 | 660 | 9,982E-01 | 960 | 9,561E-01 | 1500 | 6,209E-01 | 3000 | 6,321E-01 | 4500 | 1,064E-01 |
| 370 | 5,979E-01 | 670 | 9,979E-01 | 970 | 9,777E-01 | 1550 | 6,524E-01 | 3050 | 6,265E-01 | 4550 | 5,990E-02 |
| 380 | 7,672E-01 | 680 | 9,984E-01 | 980 | 9,918E-01 | 1600 | 8,107E-01 | 3100 | 6,167E-01 | 4600 | 2,838E-02 |
| 390 | 8,431E-01 | 690 | 9,988E-01 | 990 | 9,972E-01 | 1650 | 9,225E-01 | 3150 | 6,036E-01 | 4650 | 1,261E-02 |
| 400 | 4,080E-01 | 700 | 9,989E-01 | 1000 | 9,973E-01 | 1700 | 9,925E-01 | 3200 | 5,884E-01 | 4700 | 5,539E-03 |
| 410 | 7,567E-01 | 710 | 9,988E-01 | 1010 | 9,941E-01 | 1750 | 9,908E-01 | 3250 | 5,718E-01 | 4750 | 2,426E-03 |
| 420 | 8,714E-01 | 720 | 9,989E-01 | 1020 | 9,872E-01 | 1800 | 9,775E-01 | 3300 | 5,542E-01 | 4800 | 1,089E-03 |
| 430 | 9,625E-01 | 730 | 9,990E-01 | 1030 | 9,746E-01 | 1850 | 9,583E-01 | 3350 | 5,352E-01 | 4850 | 5,416E-04 |
| 440 | 9,508E-01 | 740 | 9,987E-01 | 1040 | 9,440E-01 | 1900 | 9,454E-01 | 3400 | 5,126E-01 | 4900 | 3,059E-04 |
| 450 | 9,640E-01 | 750 | 9,992E-01 | 1050 | 8,572E-01 | 1950 | 9,425E-01 | 3450 | 4,911E-01 | 4950 | 1,974E-04 |
| 460 | 9,014E-01 | 760 | 9,983E-01 | 1060 | 6,792E-01 | 2000 | 9,518E-01 | 3500 | 4,720E-01 | 5000 | 1,355E-04 |
| 470 | 8,266E-01 | 770 | 9,990E-01 | 1070 | 5,165E-01 | 2050 | 9,739E-01 | 3550 | 4,617E-01 | 5050 | 9,711E-05 |
| 480 | 9,043E-01 | 780 | 9,990E-01 | 1080 | 5,608E-01 | 2100 | 9,796E-01 | 3600 | 4,564E-01 | 5100 | 6,627E-05 |
| 490 | 9,311E-01 | 790 | 9,990E-01 | 1090 | 7,086E-01 | 2150 | 9,850E-01 | 3650 | 4,492E-01 | 5150 | 4,091E-05 |

# Data Sheet

## S8008G

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ = | 0,912 |
| **Spectral values guaranteed** | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| **Refractive indices** | |
| $n_F$ (486 nm) = | 1,556 |
| $n_e$ (546 nm) = | 1,551 |
| $n_d$ (587,6 nm) = | 1,548 |
| | |
| **Sellmeier coefficients** | |
| valid from 440 nm to 1550 nm | |
| $B_1$ | 0,8874 |
| $B_2$ | 0,4659 |
| $B_3$ | 21,3145 |
| $C_1$ | 1,137E-02 µm² |
| $C_2$ | 1,1165E-02 µm² |
| $C_3$ | 3495,165 µm² |
| **Internal quality** | |
| Bubble class | 0 |

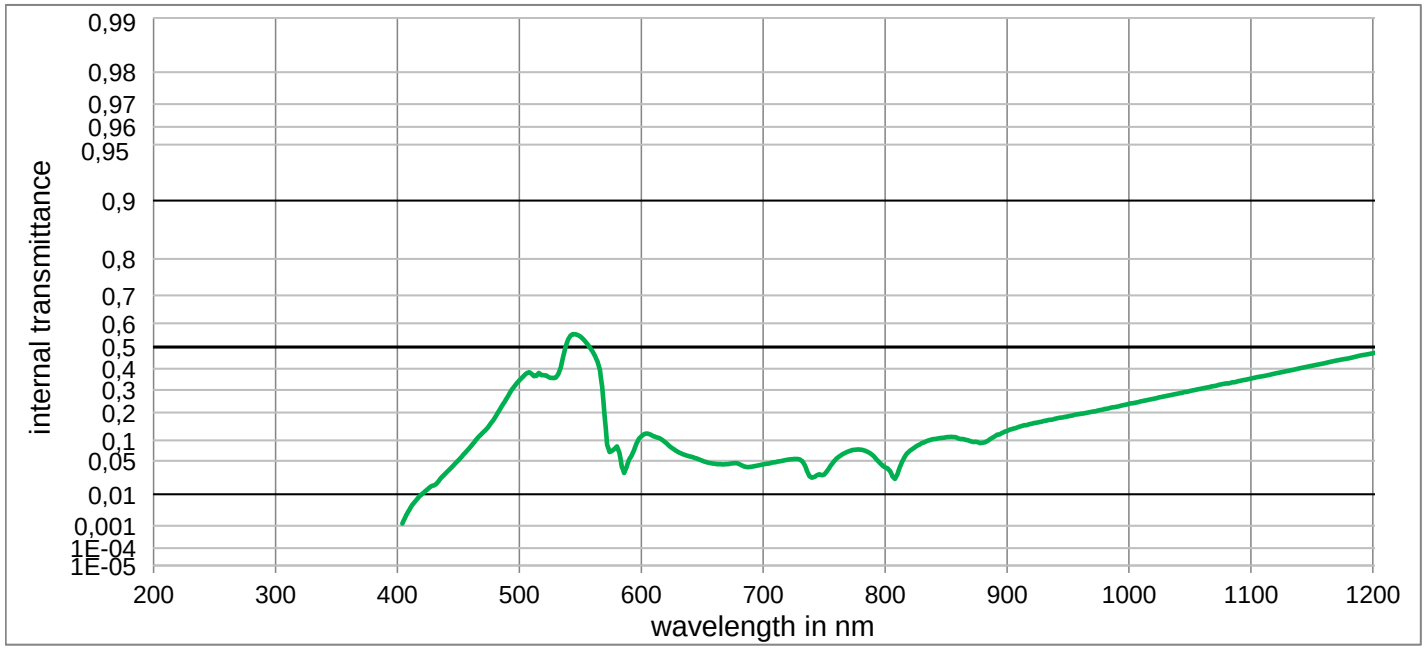
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d = | 1,00 mm |
| **Density** | |
| ρ = | 2,78 g/cm³ |
| **Knoop hardness** | |
| HK[0.1/20] = | 569 |

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

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

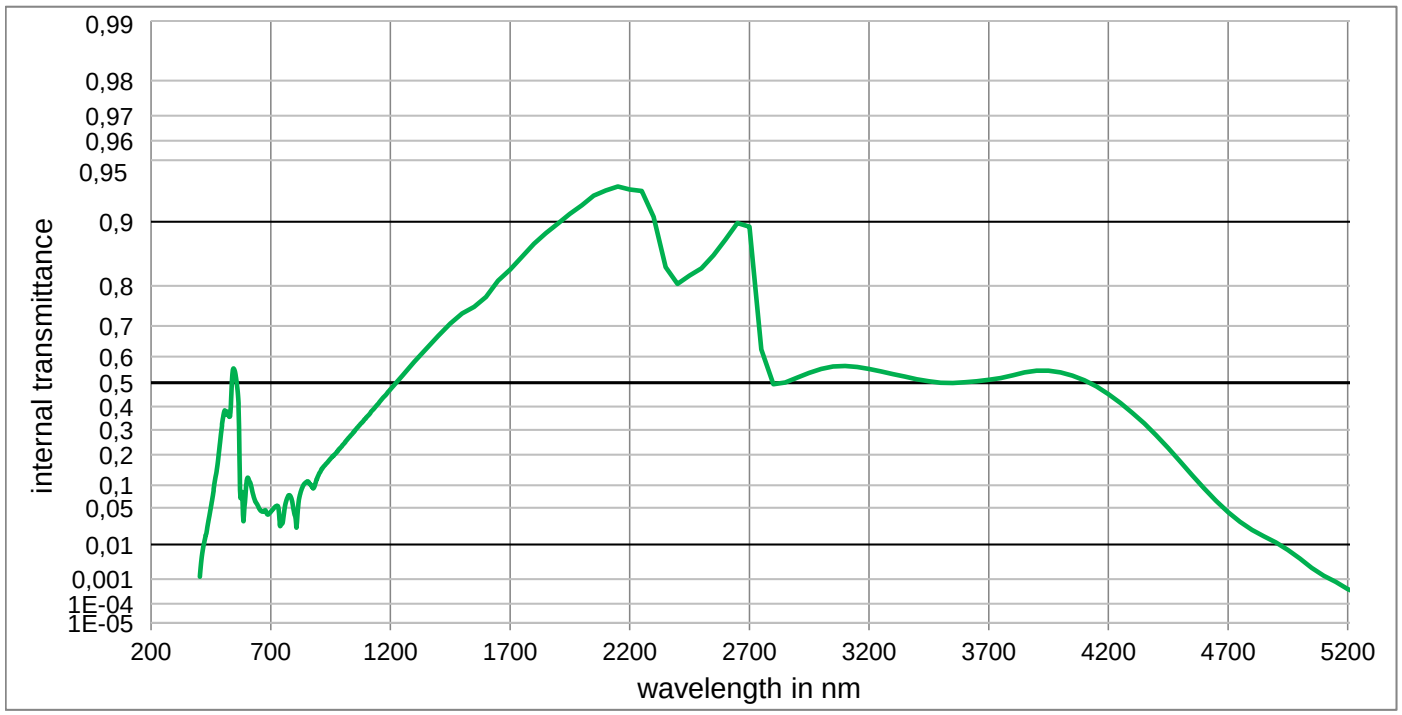
| Colormetric properties | 1 mm | 2 mm | 3 mm |
|---|---|---|---|
| Illuminant D65 | x | | |
| | y | | |
| | Y | | |
| | $\lambda_d$ | | |
| | $P_e$ | | |
| Illuminant A | x | | |
| | y | | |
| | Y | | |
| | $\lambda_d$ | | |
| | $P_e$ | | |

| Notes |
|---|
| |
| Ionically colored glass |
| |
| Contrast enhancement filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8008G




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 3,449E-01 | 800 | 3,835E-02 | 1100 | 3,535E-01 | 2200 | 9,303E-01 | 3700 | 5,118E-01 |
| 210 | < 1,0E-05 | 510 | 3,761E-01 | 810 | 2,828E-02 | 1110 | 3,650E-01 | 2250 | 9,292E-01 | 3750 | 5,188E-01 |
| 220 | < 1,0E-05 | 520 | 3,701E-01 | 820 | 7,119E-02 | 1120 | 3,779E-01 | 2300 | 9,054E-01 | 3800 | 5,291E-01 |
| 230 | < 1,0E-05 | 530 | 3,578E-01 | 830 | 9,166E-02 | 1130 | 3,891E-01 | 2350 | 8,359E-01 | 3850 | 5,408E-01 |
| 240 | < 1,0E-05 | 540 | 5,335E-01 | 840 | 1,038E-01 | 1140 | 4,021E-01 | 2400 | 8,040E-01 | 3900 | 5,474E-01 |
| 250 | < 1,0E-05 | 550 | 5,462E-01 | 850 | 1,097E-01 | 1150 | 4,136E-01 | 2450 | 8,206E-01 | 3950 | 5,475E-01 |
| 260 | < 1,0E-05 | 560 | 4,795E-01 | 860 | 1,057E-01 | 1160 | 4,259E-01 | 2500 | 8,337E-01 | 4000 | 5,411E-01 |
| 270 | < 1,0E-05 | 570 | 1,834E-01 | 870 | 9,770E-02 | 1170 | 4,384E-01 | 2550 | 8,554E-01 | 4050 | 5,286E-01 |
| 280 | < 1,0E-05 | 580 | 8,299E-02 | 880 | 9,302E-02 | 1180 | 4,488E-01 | 2600 | 8,778E-01 | 4100 | 5,098E-01 |
| 290 | < 1,0E-05 | 590 | 5,203E-02 | 890 | 1,124E-01 | 1190 | 4,617E-01 | 2650 | 8,986E-01 | 4150 | 4,845E-01 |
| 300 | < 1,0E-05 | 600 | 1,122E-01 | 900 | 1,301E-01 | 1200 | 4,725E-01 | 2700 | 8,943E-01 | 4200 | 4,530E-01 |
| 310 | < 1,0E-05 | 610 | 1,127E-01 | 910 | 1,449E-01 | 1250 | 5,288E-01 | 2750 | 6,253E-01 | 4250 | 4,152E-01 |
| 320 | < 1,000E-05 | 620 | 9,318E-02 | 920 | 1,560E-01 | 1300 | 5,811E-01 | 2800 | 4,937E-01 | 4300 | 3,734E-01 |
| 330 | < 1,000E-05 | 630 | 6,941E-02 | 930 | 1,658E-01 | 1350 | 6,280E-01 | 2850 | 5,009E-01 | 4350 | 3,278E-01 |
| 340 | < 1,000E-05 | 640 | 5,888E-02 | 940 | 1,757E-01 | 1400 | 6,701E-01 | 2900 | 5,203E-01 | 4400 | 2,778E-01 |
| 350 | < 1,000E-05 | 650 | 5,005E-02 | 950 | 1,848E-01 | 1450 | 7,065E-01 | 2950 | 5,390E-01 | 4450 | 2,258E-01 |
| 360 | < 1,000E-05 | 660 | 4,456E-02 | 960 | 1,948E-01 | 1500 | 7,348E-01 | 3000 | 5,543E-01 | 4500 | 1,749E-01 |
| 370 | < 1,000E-05 | 670 | 4,374E-02 | 970 | 2,037E-01 | 1550 | 7,519E-01 | 3050 | 5,634E-01 | 4550 | 1,294E-01 |
| 380 | < 1,000E-05 | 680 | 4,445E-02 | 980 | 2,149E-01 | 1600 | 7,756E-01 | 3100 | 5,656E-01 | 4600 | 9,202E-02 |
| 390 | < 1,000E-05 | 690 | 3,929E-02 | 990 | 2,249E-01 | 1650 | 8,104E-01 | 3150 | 5,620E-01 | 4650 | 6,337E-02 |
| 400 | < 1,000E-05 | 700 | 4,328E-02 | 1000 | 2,371E-01 | 1700 | 8,315E-01 | 3200 | 5,546E-01 | 4700 | 4,275E-02 |
| 410 | 3,762E-03 | 710 | 4,748E-02 | 1010 | 2,480E-01 | 1750 | 8,530E-01 | 3250 | 5,450E-01 | 4750 | 2,920E-02 |
| 420 | 9,953E-03 | 720 | 5,215E-02 | 1020 | 2,598E-01 | 1800 | 8,725E-01 | 3300 | 5,346E-01 | 4800 | 2,065E-02 |
| 430 | 1,650E-02 | 730 | 5,249E-02 | 1030 | 2,716E-01 | 1850 | 8,867E-01 | 3350 | 5,240E-01 | 4850 | 1,526E-02 |
| 440 | 3,046E-02 | 740 | 2,429E-02 | 1040 | 2,827E-01 | 1900 | 8,979E-01 | 3400 | 5,139E-01 | 4900 | 1,114E-02 |
| 450 | 5,121E-02 | 750 | 2,797E-02 | 1050 | 2,950E-01 | 1950 | 9,084E-01 | 3450 | 5,054E-01 | 4950 | 7,390E-03 |
| 460 | 8,230E-02 | 760 | 5,401E-02 | 1060 | 3,073E-01 | 2000 | 9,168E-01 | 3500 | 5,000E-01 | 5000 | 4,413E-03 |
| 470 | 1,248E-01 | 770 | 7,056E-02 | 1070 | 3,189E-01 | 2050 | 9,254E-01 | 3550 | 4,990E-01 | 5050 | 2,345E-03 |
| 480 | 1,794E-01 | 780 | 7,483E-02 | 1080 | 3,307E-01 | 2100 | 9,295E-01 | 3600 | 5,022E-01 | 5100 | 1,315E-03 |
| 490 | 2,659E-01 | 790 | 6,097E-02 | 1090 | 3,420E-01 | 2150 | 9,326E-01 | 3650 | 5,062E-01 | 5150 | 7,920E-04 |

# Data Sheet

## S8802

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

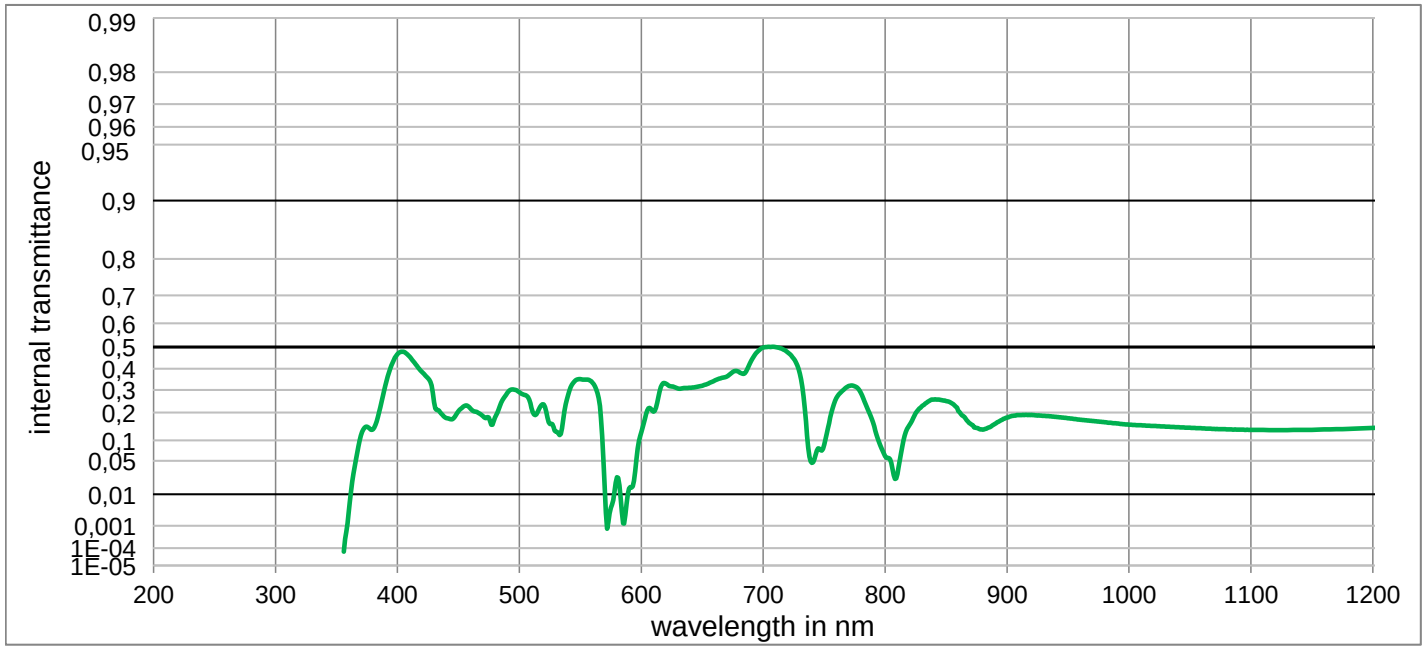
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 3,50 mm |
| **Density** | | |
| $\rho$ | = | 2,70 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | | |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 0 |
| SR class | = | 1.0 |
| AR class | = | 1.0 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

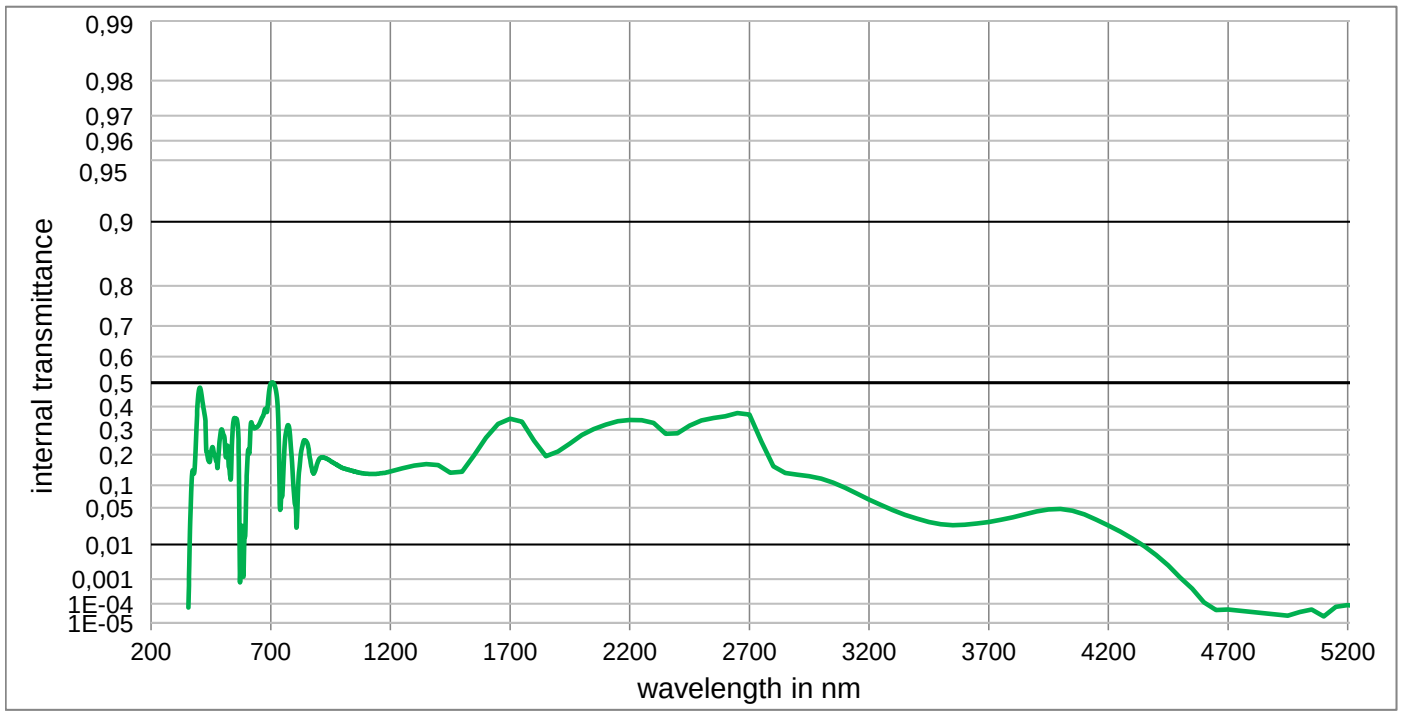
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| |
| Contrast enhancement filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8802




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 2,896E-01 | 800 | 5,938E-02 | 1100 | 1,335E-01 | 2200 | 3,427E-01 | 3700 | 2,912E-02 |
| 210 | < 1,0E-05 | 510 | 2,193E-01 | 810 | 2,875E-02 | 1110 | 1,334E-01 | 2250 | 3,415E-01 | 3750 | 3,168E-02 |
| 220 | < 1,0E-05 | 520 | 2,346E-01 | 820 | 1,510E-01 | 1120 | 1,331E-01 | 2300 | 3,298E-01 | 3800 | 3,501E-02 |
| 230 | < 1,0E-05 | 530 | 1,277E-01 | 830 | 2,257E-01 | 1130 | 1,331E-01 | 2350 | 2,833E-01 | 3850 | 3,929E-02 |
| 240 | < 1,0E-05 | 540 | 2,777E-01 | 840 | 2,563E-01 | 1140 | 1,334E-01 | 2400 | 2,858E-01 | 3900 | 4,375E-02 |
| 250 | < 1,0E-05 | 550 | 3,506E-01 | 850 | 2,499E-01 | 1150 | 1,341E-01 | 2450 | 3,180E-01 | 3950 | 4,716E-02 |
| 260 | < 1,0E-05 | 560 | 3,339E-01 | 860 | 2,056E-01 | 1160 | 1,353E-01 | 2500 | 3,404E-01 | 4000 | 4,799E-02 |
| 270 | < 1,0E-05 | 570 | 1,558E-02 | 870 | 1,562E-01 | 1170 | 1,361E-01 | 2550 | 3,510E-01 | 4050 | 4,507E-02 |
| 280 | < 1,0E-05 | 580 | 2,479E-02 | 880 | 1,342E-01 | 1180 | 1,373E-01 | 2600 | 3,584E-01 | 4100 | 3,911E-02 |
| 290 | < 1,0E-05 | 590 | 1,384E-02 | 890 | 1,547E-01 | 1190 | 1,387E-01 | 2650 | 3,715E-01 | 4150 | 3,192E-02 |
| 300 | < 1,0E-05 | 600 | 1,262E-01 | 900 | 1,799E-01 | 1200 | 1,407E-01 | 2700 | 3,654E-01 | 4200 | 2,508E-02 |
| 310 | < 1,0E-05 | 610 | 2,039E-01 | 910 | 1,893E-01 | 1250 | 1,512E-01 | 2750 | 2,525E-01 | 4250 | 1,899E-02 |
| 320 | < 1,000E-05 | 620 | 3,306E-01 | 920 | 1,902E-01 | 1300 | 1,606E-01 | 2800 | 1,581E-01 | 4300 | 1,370E-02 |
| 330 | < 1,000E-05 | 630 | 3,067E-01 | 930 | 1,869E-01 | 1350 | 1,656E-01 | 2850 | 1,361E-01 | 4350 | 9,150E-03 |
| 340 | < 1,000E-05 | 640 | 3,100E-01 | 940 | 1,825E-01 | 1400 | 1,623E-01 | 2900 | 1,305E-01 | 4400 | 5,447E-03 |
| 350 | < 1,000E-05 | 650 | 3,202E-01 | 950 | 1,769E-01 | 1450 | 1,367E-01 | 2950 | 1,264E-01 | 4450 | 2,797E-03 |
| 360 | 2,721E-03 | 660 | 3,436E-01 | 960 | 1,712E-01 | 1500 | 1,402E-01 | 3000 | 1,191E-01 | 4500 | 1,146E-03 |
| 370 | 1,147E-01 | 670 | 3,631E-01 | 970 | 1,663E-01 | 1550 | 1,984E-01 | 3050 | 1,076E-01 | 4550 | 4,483E-04 |
| 380 | 1,358E-01 | 680 | 3,854E-01 | 980 | 1,615E-01 | 1600 | 2,675E-01 | 3100 | 9,357E-02 | 4600 | 1,161E-04 |
| 390 | 3,197E-01 | 690 | 4,354E-01 | 990 | 1,568E-01 | 1650 | 3,258E-01 | 3150 | 7,907E-02 | 4650 | 4,912E-05 |
| 400 | 4,675E-01 | 700 | 4,973E-01 | 1000 | 1,526E-01 | 1700 | 3,471E-01 | 3200 | 6,593E-02 | 4700 | 5,289E-05 |
| 410 | 4,563E-01 | 710 | 5,003E-01 | 1010 | 1,501E-01 | 1750 | 3,352E-01 | 3250 | 5,475E-02 | 4750 | < 1,000E-05 |
| 420 | 3,863E-01 | 720 | 4,765E-01 | 1020 | 1,477E-01 | 1800 | 2,551E-01 | 3300 | 4,581E-02 | 4800 | < 1,000E-05 |
| 430 | 2,438E-01 | 730 | 3,768E-01 | 1030 | 1,454E-01 | 1850 | 1,944E-01 | 3350 | 3,869E-02 | 4850 | < 1,000E-05 |
| 440 | 1,778E-01 | 740 | 4,625E-02 | 1040 | 1,433E-01 | 1900 | 2,119E-01 | 3400 | 3,324E-02 | 4900 | < 1,000E-05 |
| 450 | 2,059E-01 | 750 | 8,774E-02 | 1050 | 1,411E-01 | 1950 | 2,430E-01 | 3450 | 2,897E-02 | 4950 | 2,537E-05 |
| 460 | 2,162E-01 | 760 | 2,625E-01 | 1060 | 1,392E-01 | 2000 | 2,785E-01 | 3500 | 2,641E-02 | 5000 | 3,913E-05 |
| 470 | 1,852E-01 | 770 | 3,179E-01 | 1070 | 1,368E-01 | 2050 | 3,028E-01 | 3550 | 2,529E-02 | 5050 | 5,170E-05 |
| 480 | 1,795E-01 | 780 | 2,880E-01 | 1080 | 1,355E-01 | 2100 | 3,221E-01 | 3600 | 2,587E-02 | 5100 | 2,262E-05 |
| 490 | 2,862E-01 | 790 | 1,602E-01 | 1090 | 1,347E-01 | 2150 | 3,373E-01 | 3650 | 2,724E-02 | 5150 | 7,095E-05 |

# Data Sheet

## S8806A

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,878 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (455 nm) | > | 0,71 | |
| $\tau_i$ (580 nm) | = | 0,002 | ± 0,002 |
| $\tau_i$ (618 nm) | = | 0,9 | ± 0,030 |
| $\tau_i$ (550 nm) | > | 0,76 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,6937 | |
| $n_e$ (546 nm) | = | 1,6878 | |
| $n_d$ (587,6 nm) | = | 1,6847 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 1,1147 | |
| $B_2$ | | 0,6697 | |
| $B_3$ | | 1,3665 | |
| $C_1$ | | 1,721E-02 | µm² |
| $C_2$ | | 1,7511E-13 | µm² |
| $C_3$ | | 100,000 | µm² |
| **Internal quality** | | | |
| Bubble class | | - | |

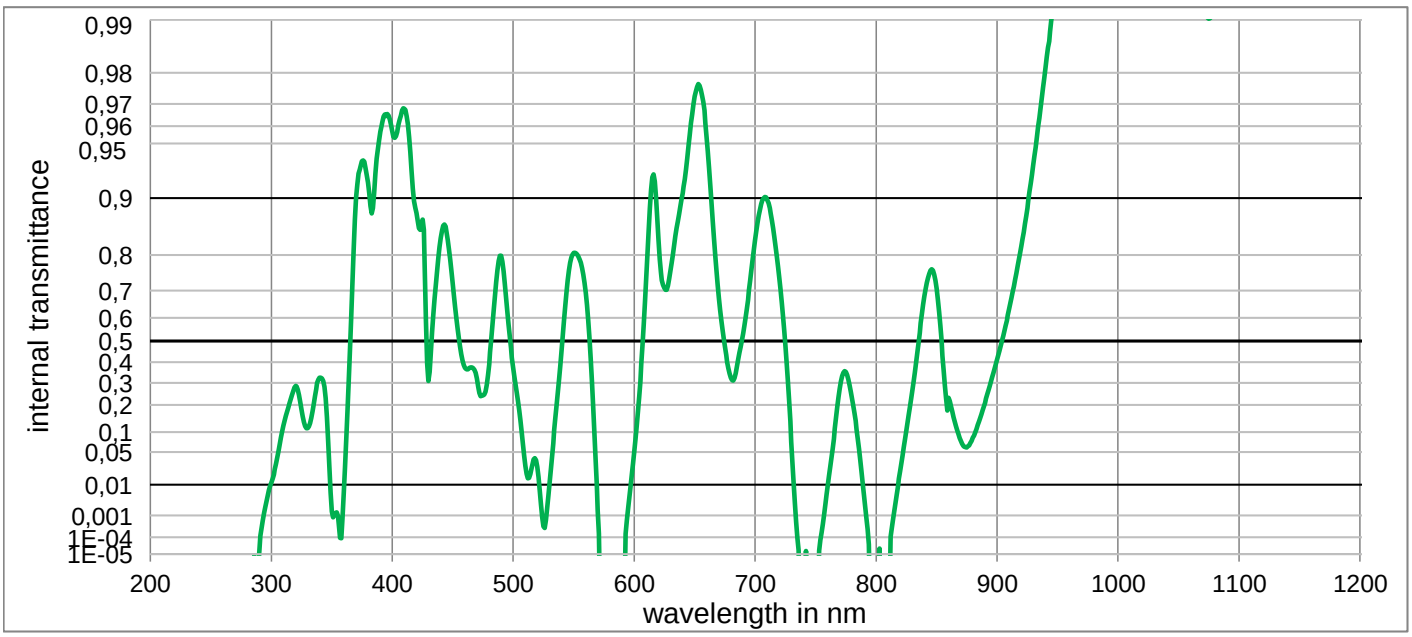
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 2,50 mm |
| **Density** | | |
| ρ | = | 3,49 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | | |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 4 |
| SR class | = | 52.0 |
| AR class | = | 1.3 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

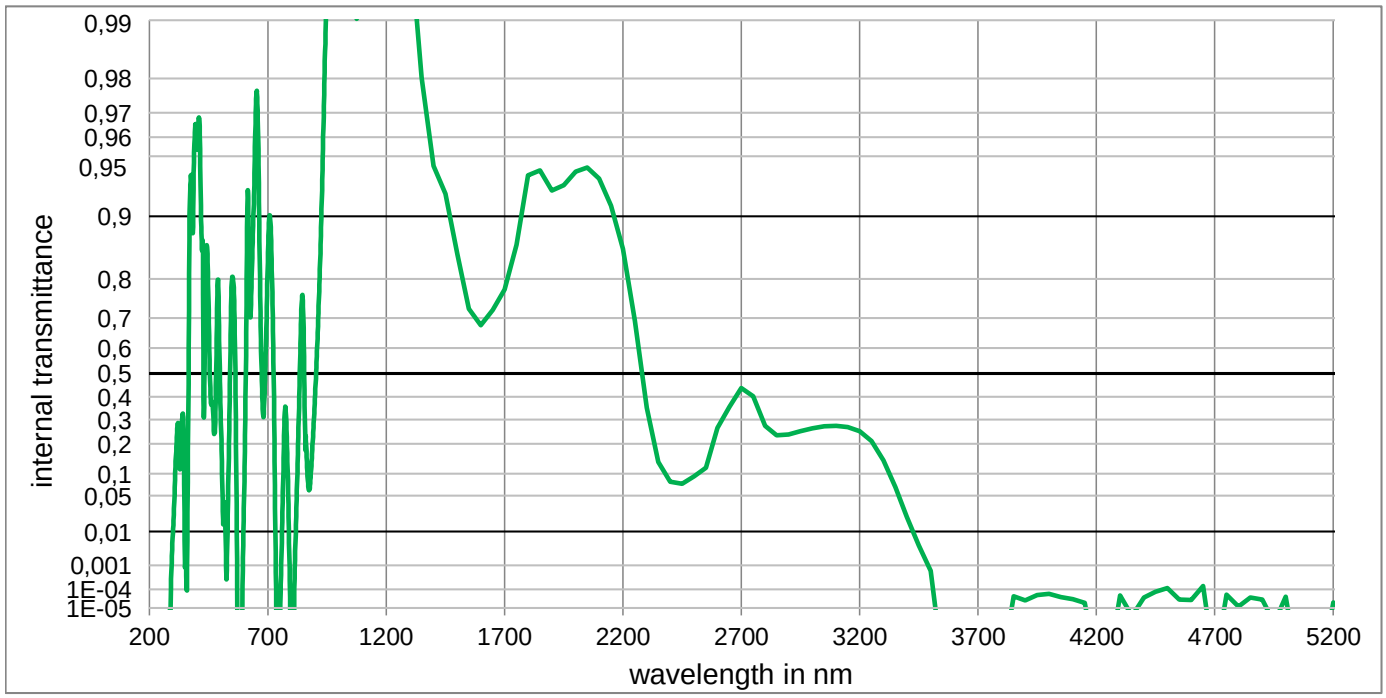
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| |
| Contrast enhancement filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8806A




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 3,756E-01 | 800 | < 1,000E-05 | 1100 | 9,956E-01 | 2200 | 8,562E-01 | 3700 | < 1,000E-05 |
| 210 | < 1,0E-05 | 510 | 2,712E-02 | 810 | < 1,000E-05 | 1110 | 9,973E-01 | 2250 | 6,926E-01 | 3750 | < 1,000E-05 |
| 220 | < 1,0E-05 | 520 | 2,623E-02 | 820 | 2,121E-02 | 1120 | 9,982E-01 | 2300 | 3,511E-01 | 3800 | < 1,000E-05 |
| 230 | < 1,0E-05 | 530 | 1,110E-02 | 830 | 2,662E-01 | 1130 | 9,988E-01 | 2350 | 1,347E-01 | 3850 | 4,460E-05 |
| 240 | < 1,0E-05 | 540 | 4,537E-01 | 840 | 6,804E-01 | 1140 | 9,994E-01 | 2400 | 7,911E-02 | 3900 | 2,669E-05 |
| 250 | < 1,0E-05 | 550 | 8,047E-01 | 850 | 7,069E-01 | 1150 | 9,997E-01 | 2450 | 7,437E-02 | 3950 | 5,235E-05 |
| 260 | < 1,0E-05 | 560 | 6,925E-01 | 860 | 2,300E-01 | 1160 | 9,997E-01 | 2500 | 9,294E-02 | 4000 | 5,942E-05 |
| 270 | < 1,0E-05 | 570 | 1,587E-03 | 870 | 7,556E-02 | 1170 | 9,992E-01 | 2550 | 1,174E-01 | 4050 | 4,125E-05 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 8,345E-02 | 1180 | 9,987E-01 | 2600 | 2,638E-01 | 4100 | 3,178E-05 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 2,096E-01 | 1190 | 9,971E-01 | 2650 | 3,548E-01 | 4150 | 2,013E-05 |
| 300 | 1,1E-02 | 600 | 5,053E-02 | 900 | 4,115E-01 | 1200 | 9,943E-01 | 2700 | 4,376E-01 | 4200 | < 1,000E-05 |
| 310 | 1,2E-01 | 610 | 7,355E-01 | 910 | 6,332E-01 | 1250 | 9,918E-01 | 2750 | 4,029E-01 | 4250 | < 1,000E-05 |
| 320 | 2,860E-01 | 620 | 8,329E-01 | 920 | 8,198E-01 | 1300 | 9,964E-01 | 2800 | 2,729E-01 | 4300 | 4,980E-05 |
| 330 | 1,121E-01 | 630 | 7,600E-01 | 930 | 9,342E-01 | 1350 | 9,802E-01 | 2850 | 2,329E-01 | 4350 | < 1,000E-05 |
| 340 | 3,242E-01 | 640 | 9,060E-01 | 940 | 9,813E-01 | 1400 | 9,441E-01 | 2900 | 2,364E-01 | 4400 | 3,969E-05 |
| 350 | 1,408E-03 | 650 | 9,729E-01 | 950 | 9,930E-01 | 1450 | 9,226E-01 | 2950 | 2,500E-01 | 4450 | 7,509E-05 |
| 360 | 5,762E-03 | 660 | 9,540E-01 | 960 | 9,957E-01 | 1500 | 8,475E-01 | 3000 | 2,630E-01 | 4500 | 1,168E-04 |
| 370 | 9,007E-01 | 670 | 6,750E-01 | 970 | 9,957E-01 | 1550 | 7,267E-01 | 3050 | 2,713E-01 | 4550 | 3,056E-05 |
| 380 | 9,175E-01 | 680 | 3,253E-01 | 980 | 9,960E-01 | 1600 | 6,782E-01 | 3100 | 2,735E-01 | 4600 | 2,932E-05 |
| 390 | 9,571E-01 | 690 | 5,335E-01 | 990 | 9,954E-01 | 1650 | 7,230E-01 | 3150 | 2,685E-01 | 4650 | 1,461E-04 |
| 400 | 9,573E-01 | 700 | 8,328E-01 | 1000 | 9,952E-01 | 1700 | 7,761E-01 | 3200 | 2,512E-01 | 4700 | < 1,000E-05 |
| 410 | 9,681E-01 | 710 | 8,975E-01 | 1010 | 9,953E-01 | 1750 | 8,624E-01 | 3250 | 2,105E-01 | 4750 | 5,584E-05 |
| 420 | 8,796E-01 | 720 | 7,394E-01 | 1020 | 9,956E-01 | 1800 | 9,376E-01 | 3300 | 1,410E-01 | 4800 | 1,183E-05 |
| 430 | 3,086E-01 | 730 | 7,187E-02 | 1030 | 9,963E-01 | 1850 | 9,409E-01 | 3350 | 6,710E-02 | 4850 | 3,964E-05 |
| 440 | 8,369E-01 | 740 | < 1,000E-05 | 1040 | 9,961E-01 | 1900 | 9,254E-01 | 3400 | 2,100E-02 | 4900 | 3,060E-05 |
| 450 | 7,247E-01 | 750 | < 1,000E-05 | 1050 | 9,950E-01 | 1950 | 9,299E-01 | 3450 | 4,390E-03 | 4950 | < 1,000E-05 |
| 460 | 3,727E-01 | 760 | 9,719E-03 | 1060 | 9,928E-01 | 2000 | 9,400E-01 | 3500 | 6,351E-04 | 5000 | 4,206E-05 |
| 470 | 3,203E-01 | 770 | 2,723E-01 | 1070 | 9,904E-01 | 2050 | 9,430E-01 | 3550 | < 1,000E-05 | 5050 | < 1,000E-05 |
| 480 | 3,882E-01 | 780 | 2,269E-01 | 1080 | 9,904E-01 | 2100 | 9,352E-01 | 3600 | < 1,000E-05 | 5100 | < 1,000E-05 |
| 490 | 7,984E-01 | 790 | 5,137E-03 | 1090 | 9,931E-01 | 2150 | 9,113E-01 | 3650 | < 1,000E-05 | 5150 | < 1,000E-05 |

# Data Sheet

## S8808

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,906 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (445 nm) | = | 0,256 | ± 0,030 |
| $\tau_i$ (555 nm) | = | 0,32 | ± 0,015 |
| $\tau_i$ (620 nm) | = | 0,285 | ± 0,030 |
| $\tau_i$ (580 nm) | ≤ | 0,02 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,5779 | |
| $n_e$ (546 nm) | = | 1,5726 | |
| $n_d$ (587,6 nm) | = | 1,5698 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,0144 | |
| $B_2$ | | 1,4016 | |
| $B_3$ | | 0,9378 | |
| $C_1$ | | 6,842E-03 | µm² |
| $C_2$ | | 1,2018E-02 | µm² |
| $C_3$ | | 128,775 | µm² |
| **Internal quality** | | | |
| Bubble class | | 0 | |

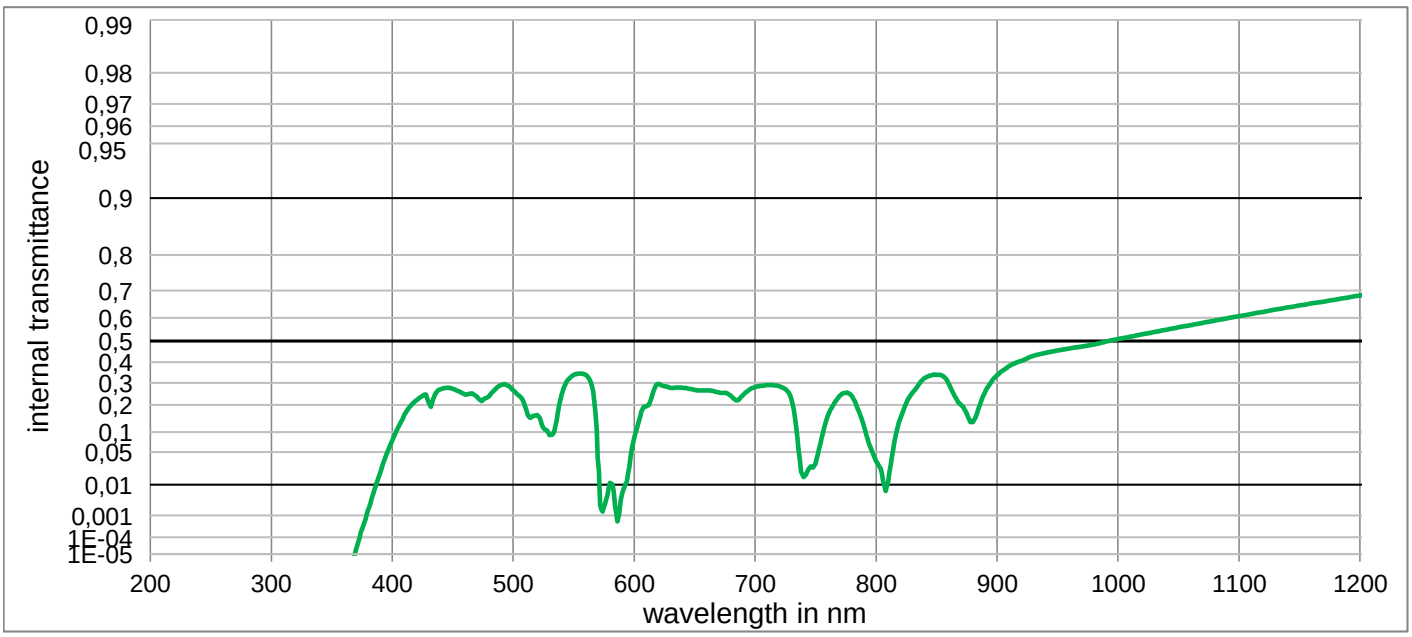
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 3,50 mm |
| **Density** | | |
| ρ | = | 2,91 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | = | 474 |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 2 |
| SR class | = | 5.4 |
| AR class | = | 1.0 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

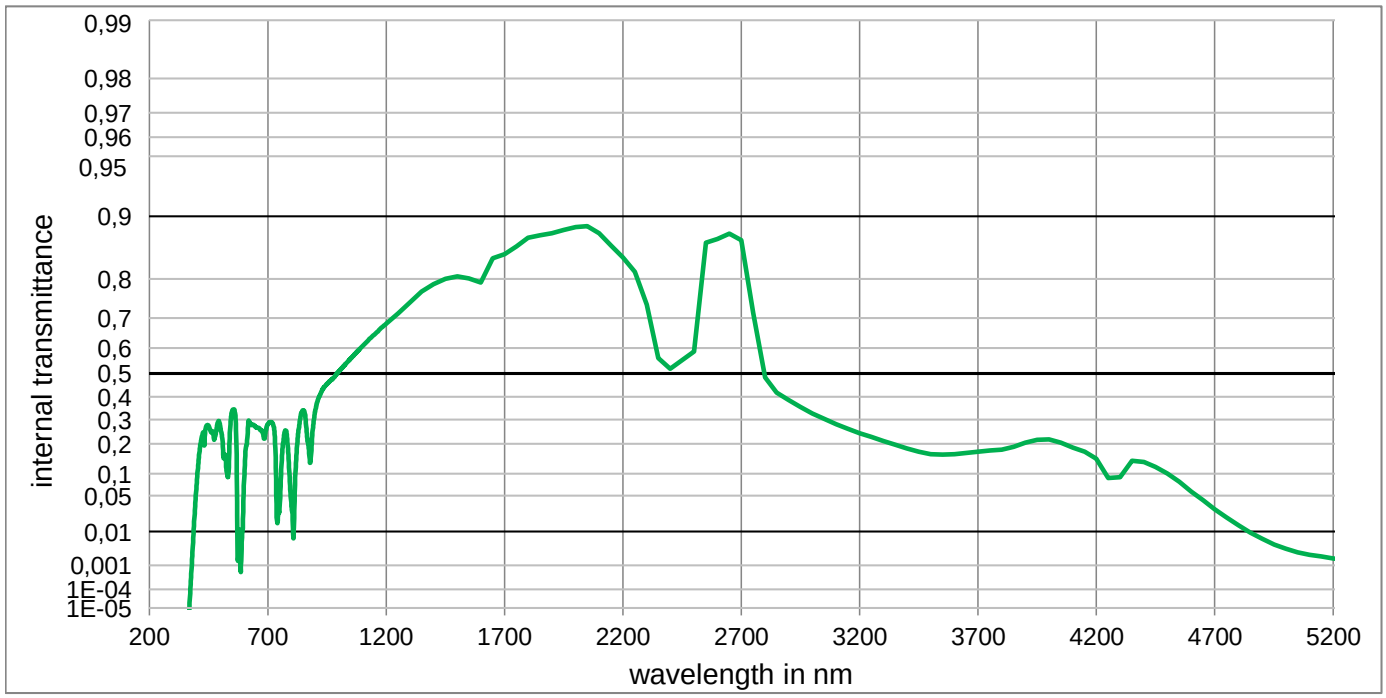
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| |
| Contrast enhancement filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8808




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 2,658E-01 | 800 | 3,340E-02 | 1100 | 6,066E-01 | 2200 | 8,417E-01 | 3700 | 1,700E-01 |
| 210 | < 1,0E-05 | 510 | 1,906E-01 | 810 | 1,205E-02 | 1110 | 6,152E-01 | 2250 | 8,148E-01 | 3750 | 1,750E-01 |
| 220 | < 1,0E-05 | 520 | 1,596E-01 | 820 | 1,434E-01 | 1120 | 6,238E-01 | 2300 | 7,380E-01 | 3800 | 1,780E-01 |
| 230 | < 1,0E-05 | 530 | 9,089E-02 | 830 | 2,533E-01 | 1130 | 6,326E-01 | 2350 | 5,627E-01 | 3850 | 1,890E-01 |
| 240 | < 1,0E-05 | 540 | 2,436E-01 | 840 | 3,224E-01 | 1140 | 6,399E-01 | 2400 | 5,192E-01 | 3900 | 2,035E-01 |
| 250 | < 1,0E-05 | 550 | 3,396E-01 | 850 | 3,397E-01 | 1150 | 6,475E-01 | 2450 | 5,543E-01 | 3950 | 2,152E-01 |
| 260 | < 1,0E-05 | 560 | 3,388E-01 | 860 | 2,978E-01 | 1160 | 6,552E-01 | 2500 | 5,867E-01 | 4000 | 2,169E-01 |
| 270 | < 1,0E-05 | 570 | 3,964E-02 | 870 | 2,009E-01 | 1170 | 6,624E-01 | 2550 | 8,652E-01 | 4050 | 2,041E-01 |
| 280 | < 1,0E-05 | 580 | 1,122E-02 | 880 | 1,332E-01 | 1180 | 6,697E-01 | 2600 | 8,708E-01 | 4100 | 1,859E-01 |
| 290 | < 1,0E-05 | 590 | 5,390E-03 | 890 | 2,573E-01 | 1190 | 6,766E-01 | 2650 | 8,783E-01 | 4150 | 1,707E-01 |
| 300 | < 1,0E-05 | 600 | 8,358E-02 | 900 | 3,362E-01 | 1200 | 6,835E-01 | 2700 | 8,691E-01 | 4200 | 1,465E-01 |
| 310 | < 1,0E-05 | 610 | 1,944E-01 | 910 | 3,809E-01 | 1250 | 7,141E-01 | 2750 | 7,151E-01 | 4250 | 8,877E-02 |
| 320 | < 1,000E-05 | 620 | 2,958E-01 | 920 | 4,066E-01 | 1300 | 7,438E-01 | 2800 | 4,837E-01 | 4300 | 9,108E-02 |
| 330 | < 1,000E-05 | 630 | 2,764E-01 | 930 | 4,304E-01 | 1350 | 7,714E-01 | 2850 | 4,193E-01 | 4350 | 1,390E-01 |
| 340 | < 1,000E-05 | 640 | 2,770E-01 | 940 | 4,446E-01 | 1400 | 7,889E-01 | 2900 | 3,853E-01 | 4400 | 1,345E-01 |
| 350 | < 1,000E-05 | 650 | 2,671E-01 | 950 | 4,556E-01 | 1450 | 8,002E-01 | 2950 | 3,548E-01 | 4450 | 1,202E-01 |
| 360 | < 1,000E-05 | 660 | 2,641E-01 | 960 | 4,655E-01 | 1500 | 8,052E-01 | 3000 | 3,267E-01 | 4500 | 1,008E-01 |
| 370 | 1,993E-05 | 670 | 2,546E-01 | 970 | 4,745E-01 | 1550 | 8,012E-01 | 3050 | 3,022E-01 | 4550 | 7,953E-02 |
| 380 | 1,618E-03 | 680 | 2,402E-01 | 980 | 4,839E-01 | 1600 | 7,926E-01 | 3100 | 2,801E-01 | 4600 | 5,730E-02 |
| 390 | 1,990E-02 | 690 | 2,435E-01 | 990 | 4,972E-01 | 1650 | 8,400E-01 | 3150 | 2,601E-01 | 4650 | 4,197E-02 |
| 400 | 7,673E-02 | 700 | 2,805E-01 | 1000 | 5,088E-01 | 1700 | 8,474E-01 | 3200 | 2,422E-01 | 4700 | 2,965E-02 |
| 410 | 1,583E-01 | 710 | 2,892E-01 | 1010 | 5,192E-01 | 1750 | 8,599E-01 | 3250 | 2,263E-01 | 4750 | 2,034E-02 |
| 420 | 2,205E-01 | 720 | 2,842E-01 | 1020 | 5,300E-01 | 1800 | 8,727E-01 | 3300 | 2,111E-01 | 4800 | 1,385E-02 |
| 430 | 2,123E-01 | 730 | 2,264E-01 | 1030 | 5,402E-01 | 1850 | 8,763E-01 | 3350 | 1,971E-01 | 4850 | 9,452E-03 |
| 440 | 2,705E-01 | 740 | 1,541E-02 | 1040 | 5,502E-01 | 1900 | 8,791E-01 | 3400 | 1,829E-01 | 4900 | 6,526E-03 |
| 450 | 2,731E-01 | 750 | 3,008E-02 | 1050 | 5,604E-01 | 1950 | 8,835E-01 | 3450 | 1,704E-01 | 4950 | 4,632E-03 |
| 460 | 2,466E-01 | 760 | 1,564E-01 | 1060 | 5,696E-01 | 2000 | 8,871E-01 | 3500 | 1,622E-01 | 5000 | 3,452E-03 |
| 470 | 2,368E-01 | 770 | 2,397E-01 | 1070 | 5,794E-01 | 2050 | 8,882E-01 | 3550 | 1,598E-01 | 5050 | 2,733E-03 |
| 480 | 2,381E-01 | 780 | 2,379E-01 | 1080 | 5,887E-01 | 2100 | 8,792E-01 | 3600 | 1,622E-01 | 5100 | 2,295E-03 |
| 490 | 2,901E-01 | 790 | 1,188E-01 | 1090 | 5,980E-01 | 2150 | 8,611E-01 | 3650 | 1,660E-01 | 5150 | 1,988E-03 |

# Data Sheet

## S8809

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,905 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (440 nm) | = | 0,196 | ± 0,033 |
| $\tau_i$ (550 nm) | = | 0,234 | ± 0,032 |
| $\tau_i$ (620 nm) | = | 0,229 | ± 0,027 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,582 | |
| $n_e$ (546 nm) | = | 1,576 | |
| $n_d$ (587,6 nm) | = | 1,574 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 1,2022 | |
| $B_2$ | | 0,2267 | |
| $B_3$ | | 3,0814 | |
| $C_1$ | | 1,377E-02 | µm² |
| $C_2$ | | 4,8304E-04 | µm² |
| $C_3$ | | 394,060 | µm² |
| **Internal quality** | | | |
| Bubble class | | - | |

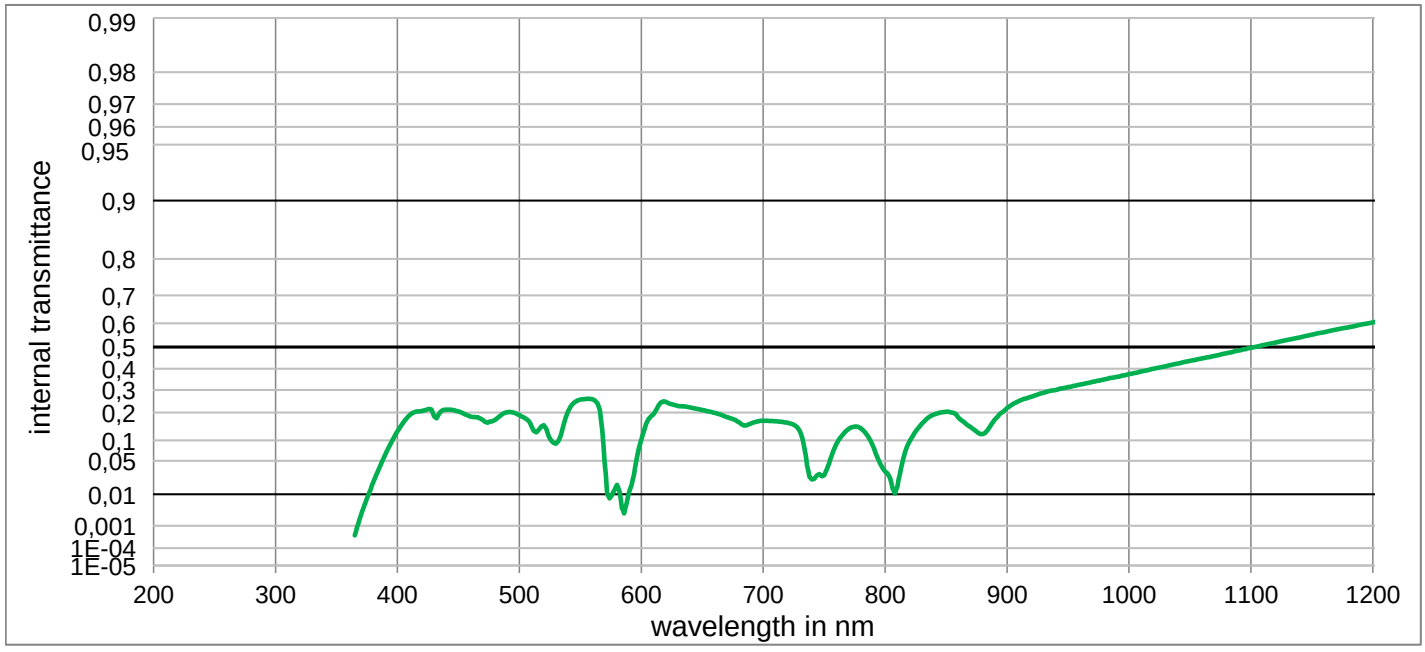
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 2,20 mm |
| **Density** | | |
| ρ | = | 2,91 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | | |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | |
| SR class | |
| AR class | |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

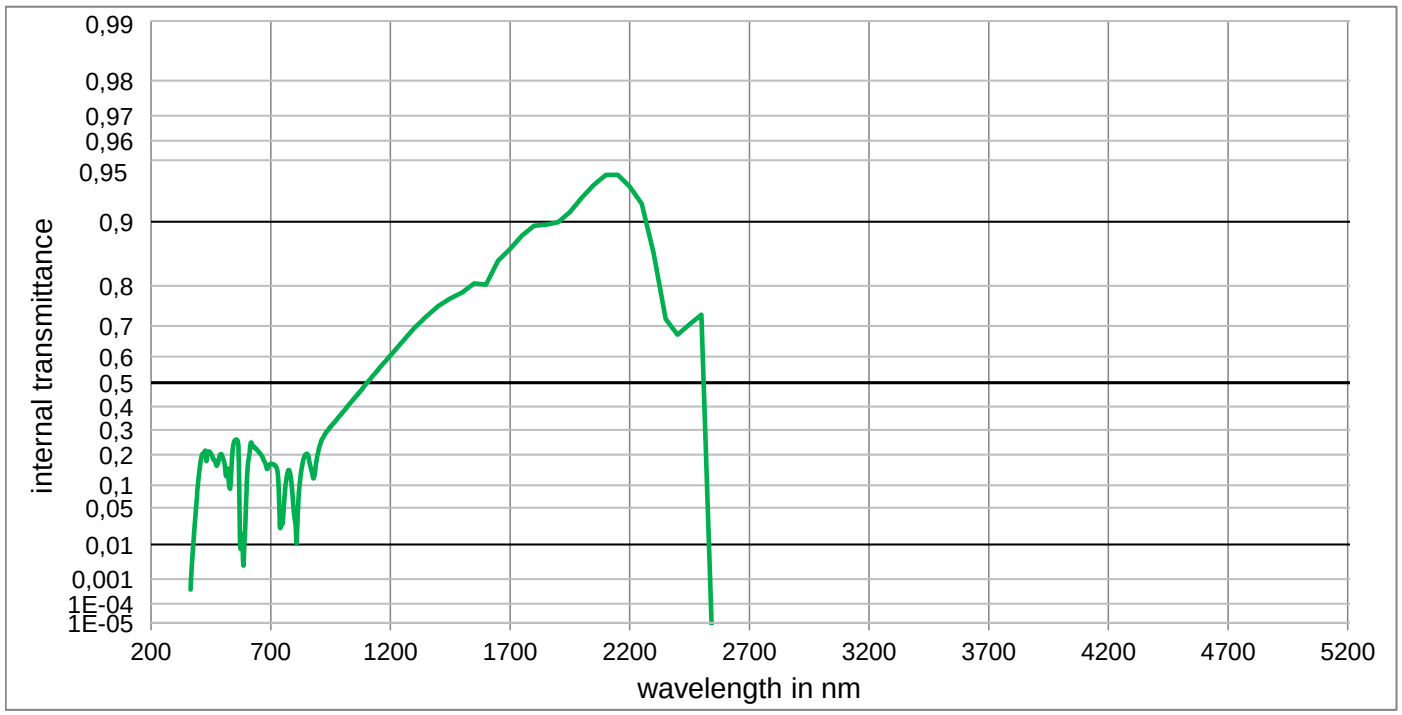
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,293 | 0,366 | 0,320 |
| | y | 0,309 | 0,406 | 0,288 |
| | Y | 35,9 | 18,8 | 12,9 |
| | $\lambda_d$ | 477,2 | 572,0 | |
| | $P_e$ | 0,091 | 0,365 | 0,093 |
| Illuminant A | x | 0,438 | 0,480 |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

| Notes |
|---|
| |
| |
| Contrast enhancement filter |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8809




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 1,892E-01 | 800 | 3,197E-02 | 1100 | 4,965E-01 | 2200 | 9,327E-01 | 3700 | < 1,000E-05 |
| 210 | < 1,0E-05 | 510 | 1,470E-01 | 810 | 1,562E-02 | 1110 | 5,084E-01 | 2250 | 9,180E-01 | 3750 | < 1,000E-05 |
| 220 | < 1,0E-05 | 520 | 1,503E-01 | 820 | 9,677E-02 | 1120 | 5,200E-01 | 2300 | 8,590E-01 | 3800 | < 1,000E-05 |
| 230 | < 1,0E-05 | 530 | 9,059E-02 | 830 | 1,552E-01 | 1130 | 5,308E-01 | 2350 | 7,200E-01 | 3850 | < 1,000E-05 |
| 240 | < 1,0E-05 | 540 | 2,057E-01 | 840 | 1,911E-01 | 1140 | 5,419E-01 | 2400 | 6,736E-01 | 3900 | < 1,000E-05 |
| 250 | < 1,0E-05 | 550 | 2,561E-01 | 850 | 2,030E-01 | 1150 | 5,532E-01 | 2450 | 7,050E-01 | 3950 | < 1,000E-05 |
| 260 | < 1,0E-05 | 560 | 2,571E-01 | 860 | 1,797E-01 | 1160 | 5,639E-01 | 2500 | 7,315E-01 | 4000 | < 1,000E-05 |
| 270 | < 1,0E-05 | 570 | 4,613E-02 | 870 | 1,442E-01 | 1170 | 5,750E-01 | 2550 | < 1,000E-05 | 4050 | < 1,000E-05 |
| 280 | < 1,0E-05 | 580 | 1,691E-02 | 880 | 1,193E-01 | 1180 | 5,840E-01 | 2600 | < 1,000E-05 | 4100 | < 1,000E-05 |
| 290 | < 1,0E-05 | 590 | 1,121E-02 | 890 | 1,714E-01 | 1190 | 5,946E-01 | 2650 | < 1,000E-05 | 4150 | < 1,000E-05 |
| 300 | < 1,0E-05 | 600 | 1,025E-01 | 900 | 2,190E-01 | 1200 | 6,036E-01 | 2700 | < 1,000E-05 | 4200 | < 1,000E-05 |
| 310 | < 1,0E-05 | 610 | 1,928E-01 | 910 | 2,503E-01 | 1250 | 6,515E-01 | 2750 | < 1,000E-05 | 4250 | < 1,000E-05 |
| 320 | < 1,000E-05 | 620 | 2,458E-01 | 920 | 2,690E-01 | 1300 | 6,941E-01 | 2800 | < 1,000E-05 | 4300 | < 1,000E-05 |
| 330 | < 1,000E-05 | 630 | 2,280E-01 | 930 | 2,877E-01 | 1350 | 7,265E-01 | 2850 | < 1,000E-05 | 4350 | < 1,000E-05 |
| 340 | < 1,000E-05 | 640 | 2,216E-01 | 940 | 3,005E-01 | 1400 | 7,539E-01 | 2900 | < 1,000E-05 | 4400 | < 1,000E-05 |
| 350 | < 1,000E-05 | 650 | 2,103E-01 | 950 | 3,134E-01 | 1450 | 7,724E-01 | 2950 | < 1,000E-05 | 4450 | < 1,000E-05 |
| 360 | < 1,000E-05 | 660 | 1,988E-01 | 960 | 3,256E-01 | 1500 | 7,855E-01 | 3000 | < 1,000E-05 | 4500 | < 1,000E-05 |
| 370 | 2,355E-03 | 670 | 1,818E-01 | 970 | 3,377E-01 | 1550 | 8,051E-01 | 3050 | < 1,000E-05 | 4550 | < 1,000E-05 |
| 380 | 1,874E-02 | 680 | 1,619E-01 | 980 | 3,497E-01 | 1600 | 8,025E-01 | 3100 | < 1,000E-05 | 4600 | < 1,000E-05 |
| 390 | 6,302E-02 | 690 | 1,566E-01 | 990 | 3,610E-01 | 1650 | 8,468E-01 | 3150 | < 1,000E-05 | 4650 | < 1,000E-05 |
| 400 | 1,283E-01 | 700 | 1,669E-01 | 1000 | 3,748E-01 | 1700 | 8,651E-01 | 3200 | < 1,000E-05 | 4700 | < 1,000E-05 |
| 410 | 1,895E-01 | 710 | 1,651E-01 | 1010 | 3,870E-01 | 1750 | 8,836E-01 | 3250 | < 1,000E-05 | 4750 | < 1,000E-05 |
| 420 | 2,062E-01 | 720 | 1,594E-01 | 1020 | 3,999E-01 | 1800 | 8,956E-01 | 3300 | < 1,000E-05 | 4800 | < 1,000E-05 |
| 430 | 1,849E-01 | 730 | 1,295E-01 | 1030 | 4,119E-01 | 1850 | 8,965E-01 | 3350 | < 1,000E-05 | 4850 | < 1,000E-05 |
| 440 | 2,120E-01 | 740 | 2,216E-02 | 1040 | 4,244E-01 | 1900 | 8,993E-01 | 3400 | < 1,000E-05 | 4900 | < 1,000E-05 |
| 450 | 2,043E-01 | 750 | 2,719E-02 | 1050 | 4,365E-01 | 1950 | 9,102E-01 | 3450 | < 1,000E-05 | 4950 | < 1,000E-05 |
| 460 | 1,831E-01 | 760 | 8,913E-02 | 1060 | 4,478E-01 | 2000 | 9,235E-01 | 3500 | < 1,000E-05 | 5000 | < 1,000E-05 |
| 470 | 1,702E-01 | 770 | 1,371E-01 | 1070 | 4,601E-01 | 2050 | 9,337E-01 | 3550 | < 1,000E-05 | 5050 | < 1,000E-05 |
| 480 | 1,699E-01 | 780 | 1,396E-01 | 1080 | 4,717E-01 | 2100 | 9,408E-01 | 3600 | < 1,000E-05 | 5100 | < 1,000E-05 |
| 490 | 2,016E-01 | 790 | 8,357E-02 | 1090 | 4,848E-01 | 2150 | 9,410E-01 | 3650 | < 1,000E-05 | 5150 | < 1,000E-05 |

# Data Sheet

## S8851

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,880 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (805 nm) | = | 0,414 | ± 0,28 |
| $\tau_i$ (976 nm) | = | 0,578 | ± 0,034 |
| $\tau_i$ (1222 nm) | = | 0,323 | ± 0,023 |
| $\tau_i$ (1945 nm) | = | 0,29 | ± 0,023 |
| $\tau_i$ (710 nm) | ≥ | 0,966 | |
| **Refractive indices** | | | |
| $n_d$ (587,6 nm) | = | 1,678 | |
| **Sellmeier coefficients** | | | |
| on request | | | |
| **Internal quality** | | | |
| Bubble class | | 2 | |

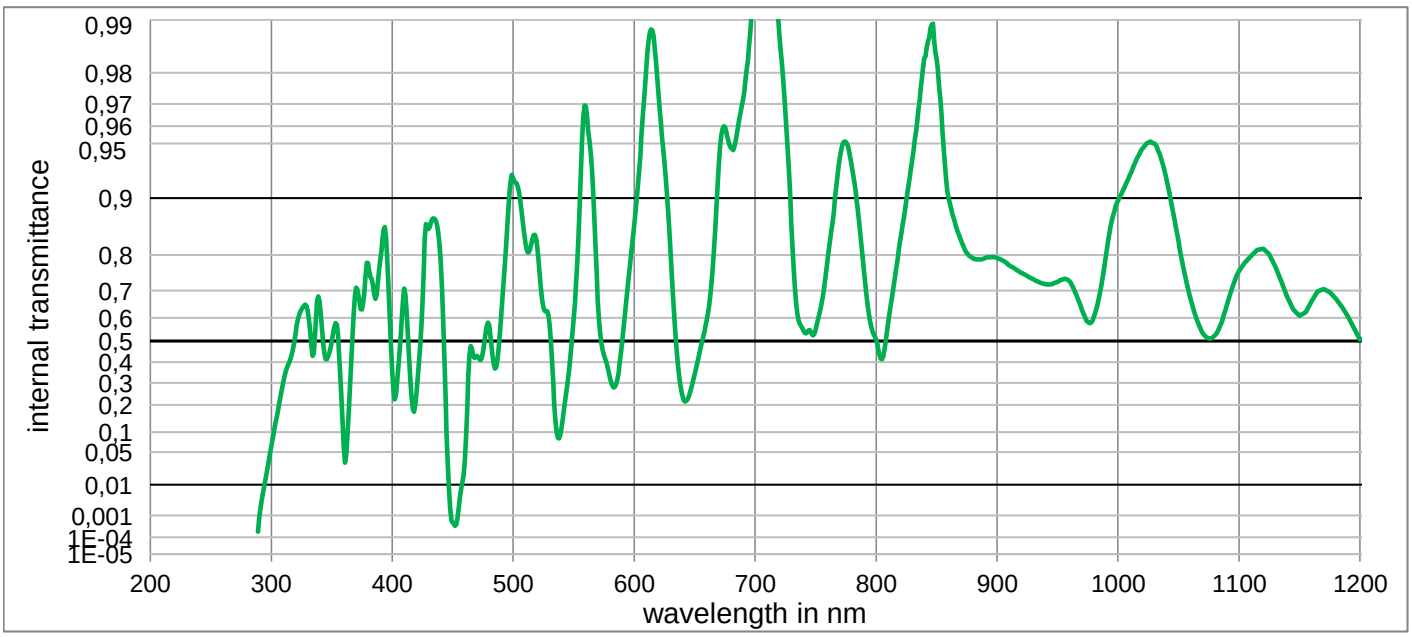
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 2,00 mm |
| **Density** | | |
| ρ | = | 3,58 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | | |

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

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

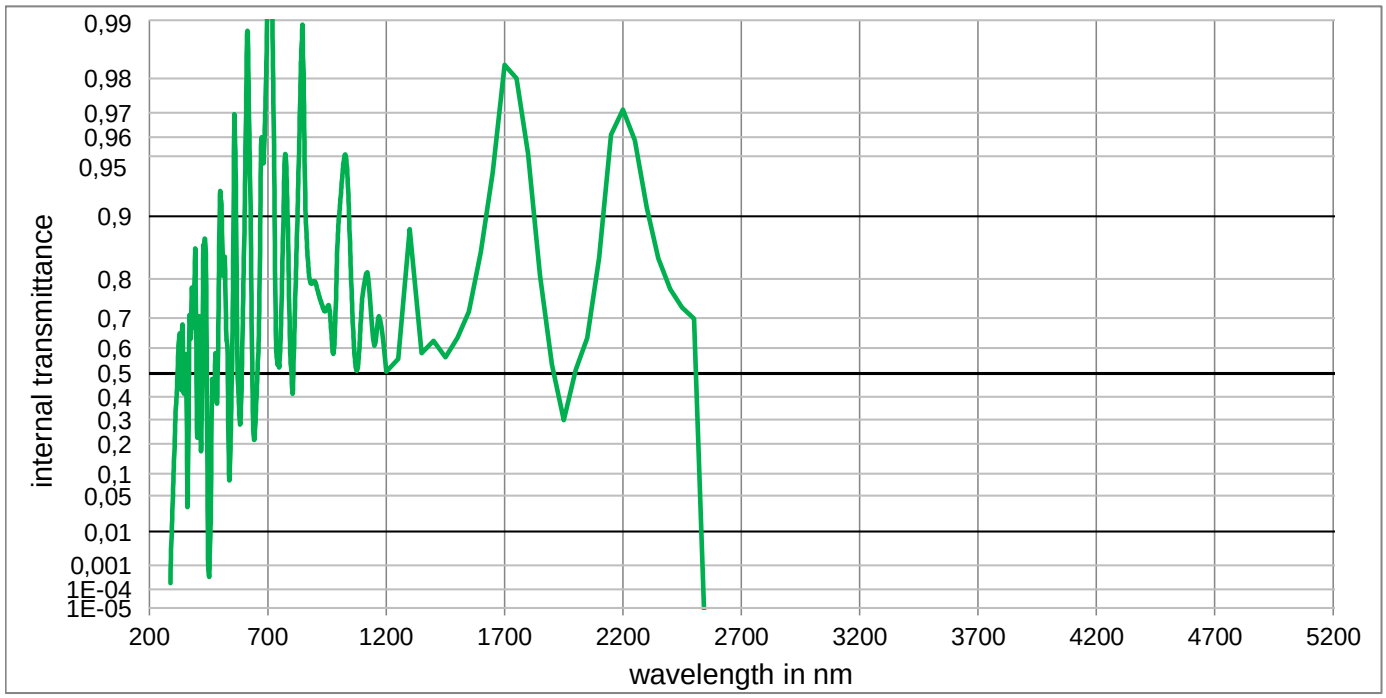
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| Contrast enhancement filter |
| DIN 58131 |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S8851




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,223E-01 | 800 | 5,049E-01 | 1100 | 7,593E-01 | 2200 | 9,710E-01 | 3700 | < 1,000E-05 |
| 210 | < 1,0E-05 | 510 | 8,278E-01 | 810 | 5,805E-01 | 1110 | 7,978E-01 | 2250 | 9,585E-01 | 3750 | < 1,000E-05 |
| 220 | < 1,0E-05 | 520 | 8,179E-01 | 820 | 8,305E-01 | 1120 | 8,142E-01 | 2300 | 9,092E-01 | 3800 | < 1,000E-05 |
| 230 | < 1,0E-05 | 530 | 5,710E-01 | 830 | 9,396E-01 | 1130 | 7,717E-01 | 2350 | 8,398E-01 | 3850 | < 1,000E-05 |
| 240 | < 1,0E-05 | 540 | 1,134E-01 | 840 | 9,835E-01 | 1140 | 6,787E-01 | 2400 | 7,774E-01 | 3900 | < 1,000E-05 |
| 250 | < 1,0E-05 | 550 | 6,050E-01 | 850 | 9,833E-01 | 1150 | 6,080E-01 | 2450 | 7,296E-01 | 3950 | < 1,000E-05 |
| 260 | < 1,0E-05 | 560 | 9,692E-01 | 860 | 9,003E-01 | 1160 | 6,624E-01 | 2500 | 6,979E-01 | 4000 | < 1,000E-05 |
| 270 | < 1,0E-05 | 570 | 6,676E-01 | 870 | 8,321E-01 | 1170 | 7,053E-01 | 2550 | < 1,000E-05 | 4050 | < 1,000E-05 |
| 280 | < 1,0E-05 | 580 | 3,229E-01 | 880 | 7,920E-01 | 1180 | 6,737E-01 | 2600 | < 1,000E-05 | 4100 | < 1,000E-05 |
| 290 | 7,4E-04 | 590 | 4,870E-01 | 890 | 7,927E-01 | 1190 | 6,053E-01 | 2650 | < 1,000E-05 | 4150 | < 1,000E-05 |
| 300 | 6,4E-02 | 600 | 8,614E-01 | 900 | 7,931E-01 | 1200 | 5,074E-01 | 2700 | < 1,000E-05 | 4200 | < 1,000E-05 |
| 310 | 3,1E-01 | 610 | 9,807E-01 | 910 | 7,746E-01 | 1250 | 5,581E-01 | 2750 | < 1,000E-05 | 4250 | < 1,000E-05 |
| 320 | 5,353E-01 | 620 | 9,737E-01 | 920 | 7,541E-01 | 1300 | 8,846E-01 | 2800 | < 1,000E-05 | 4300 | < 1,000E-05 |
| 330 | 6,291E-01 | 630 | 8,132E-01 | 930 | 7,354E-01 | 1350 | 5,817E-01 | 2850 | < 1,000E-05 | 4350 | < 1,000E-05 |
| 340 | 6,630E-01 | 640 | 2,353E-01 | 940 | 7,207E-01 | 1400 | 6,255E-01 | 2900 | < 1,000E-05 | 4400 | < 1,000E-05 |
| 350 | 5,002E-01 | 650 | 3,410E-01 | 950 | 7,278E-01 | 1450 | 5,655E-01 | 2950 | < 1,000E-05 | 4450 | < 1,000E-05 |
| 360 | 6,054E-02 | 660 | 5,866E-01 | 960 | 7,282E-01 | 1500 | 6,359E-01 | 3000 | < 1,000E-05 | 4500 | < 1,000E-05 |
| 370 | 7,091E-01 | 670 | 9,356E-01 | 970 | 6,340E-01 | 1550 | 7,190E-01 | 3050 | < 1,000E-05 | 4550 | < 1,000E-05 |
| 380 | 7,802E-01 | 680 | 9,473E-01 | 980 | 6,015E-01 | 1600 | 8,507E-01 | 3100 | < 1,000E-05 | 4600 | < 1,000E-05 |
| 390 | 7,899E-01 | 690 | 9,717E-01 | 990 | 7,979E-01 | 1650 | 9,396E-01 | 3150 | < 1,000E-05 | 4650 | < 1,000E-05 |
| 400 | 3,551E-01 | 700 | 9,941E-01 | 1000 | 8,961E-01 | 1700 | 9,830E-01 | 3200 | < 1,000E-05 | 4700 | < 1,000E-05 |
| 410 | 7,061E-01 | 710 | 9,983E-01 | 1010 | 9,259E-01 | 1750 | 9,800E-01 | 3250 | < 1,000E-05 | 4750 | < 1,000E-05 |
| 420 | 2,536E-01 | 720 | 9,879E-01 | 1020 | 9,464E-01 | 1800 | 9,516E-01 | 3300 | < 1,000E-05 | 4800 | < 1,000E-05 |
| 430 | 8,538E-01 | 730 | 8,645E-01 | 1030 | 9,499E-01 | 1850 | 8,076E-01 | 3350 | < 1,000E-05 | 4850 | < 1,000E-05 |
| 440 | 7,831E-01 | 740 | 5,461E-01 | 1040 | 9,218E-01 | 1900 | 5,381E-01 | 3400 | < 1,000E-05 | 4900 | < 1,000E-05 |
| 450 | 5,000E-04 | 750 | 5,475E-01 | 1050 | 8,292E-01 | 1950 | 2,986E-01 | 3450 | < 1,000E-05 | 4950 | < 1,000E-05 |
| 460 | 3,825E-02 | 760 | 7,924E-01 | 1060 | 6,715E-01 | 2000 | 5,150E-01 | 3500 | < 1,000E-05 | 5000 | < 1,000E-05 |
| 470 | 4,309E-01 | 770 | 9,394E-01 | 1070 | 5,371E-01 | 2050 | 6,356E-01 | 3550 | < 1,000E-05 | 5050 | < 1,000E-05 |
| 480 | 5,707E-01 | 780 | 9,316E-01 | 1080 | 5,246E-01 | 2100 | 8,405E-01 | 3600 | < 1,000E-05 | 5100 | < 1,000E-05 |
| 490 | 6,053E-01 | 790 | 7,605E-01 | 1090 | 6,477E-01 | 2150 | 9,613E-01 | 3650 | < 1,000E-05 | 5150 | < 1,000E-05 |

# Data Sheet

## N-WG205

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

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

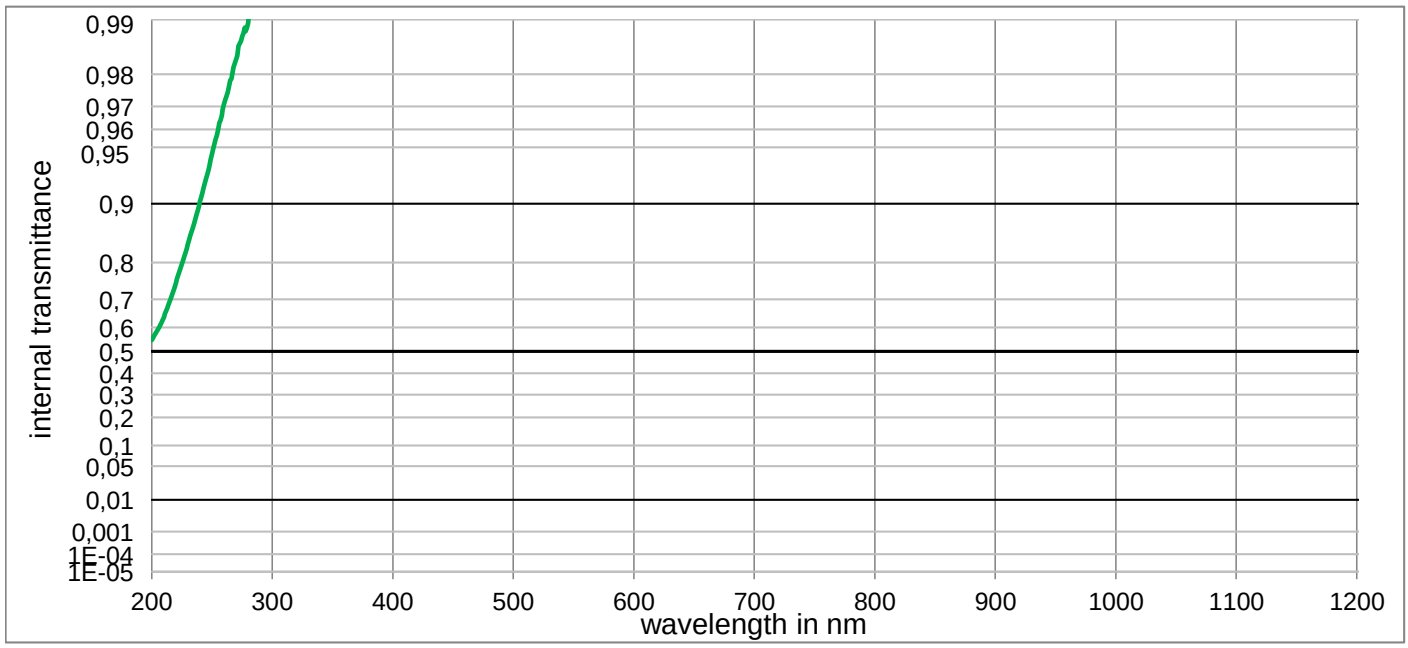
| Thermal properties | |
|---|---|
| **Transformation temperature** | |
| Tg | = 440 °C |
| **Thermal expansion in** | $10^{-6}$/K |
| $\alpha_{(20°C/300°C)}$ | = 4,1 |

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

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

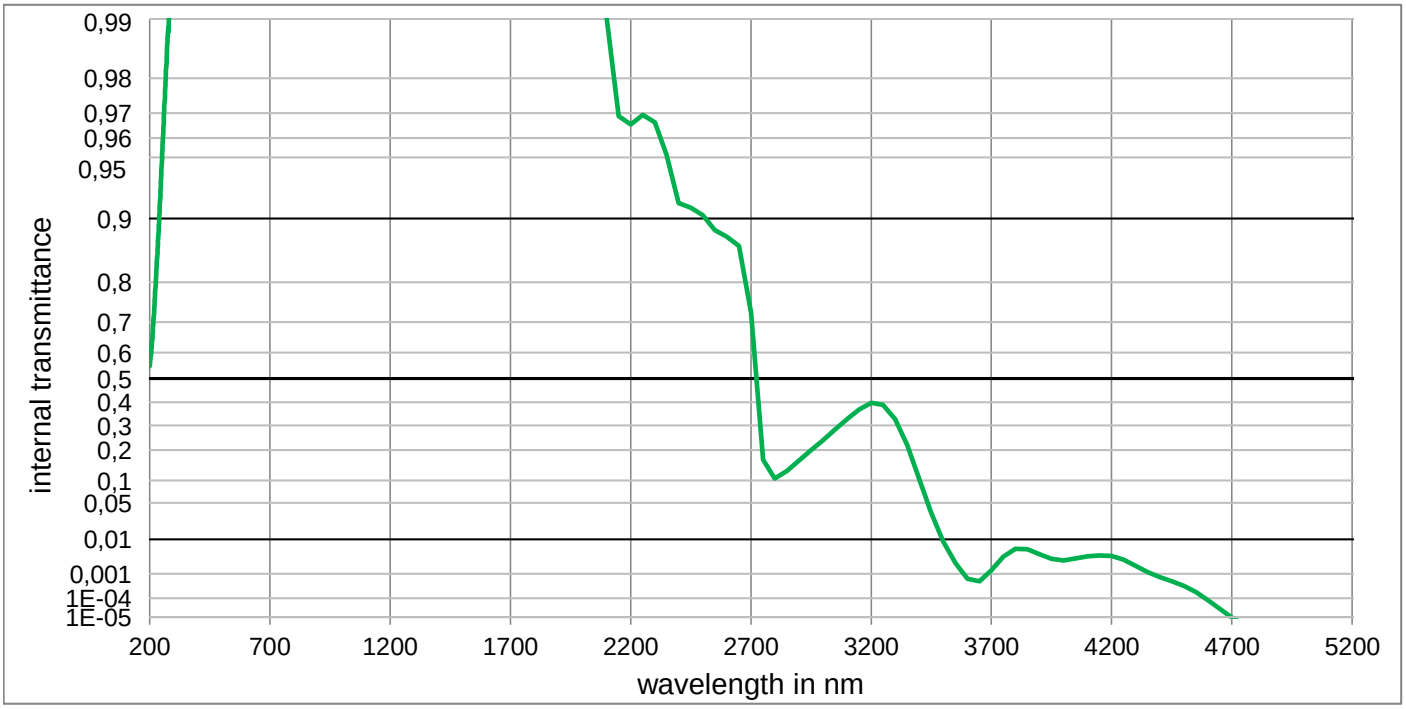
| Notes |
|---|
| |
| Longpass filter |
| |
| DIN 58131 |
| |

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



# Data Sheet

## N-WG205




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

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

# Data Sheet

## N-WG280

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ = | 0,919 |
| **Spectral values guaranteed (d = 2 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) = | 280 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) = | 230 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,99) = | 380 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) = | 1,52 |
| $n_s$ ( 852 nm) = | 1,51 |
| $n_t$ (1014 nm) = | 1,51 |
| **Sellmeier coefficients** | |
| valid from 440 nm to 1550 nm | |
| $B_1$ = | 0,7641 |
| $B_2$ = | 0,5089 |
| $B_3$ = | 1,8825 |
| $C_1$ = | 1,388E-02 µm² |
| $C_2$ = | 1,8223E-05 µm² |
| $C_3$ = | 202,101 µm² |
| **Internal quality** | |
| Bubble class | 1 |

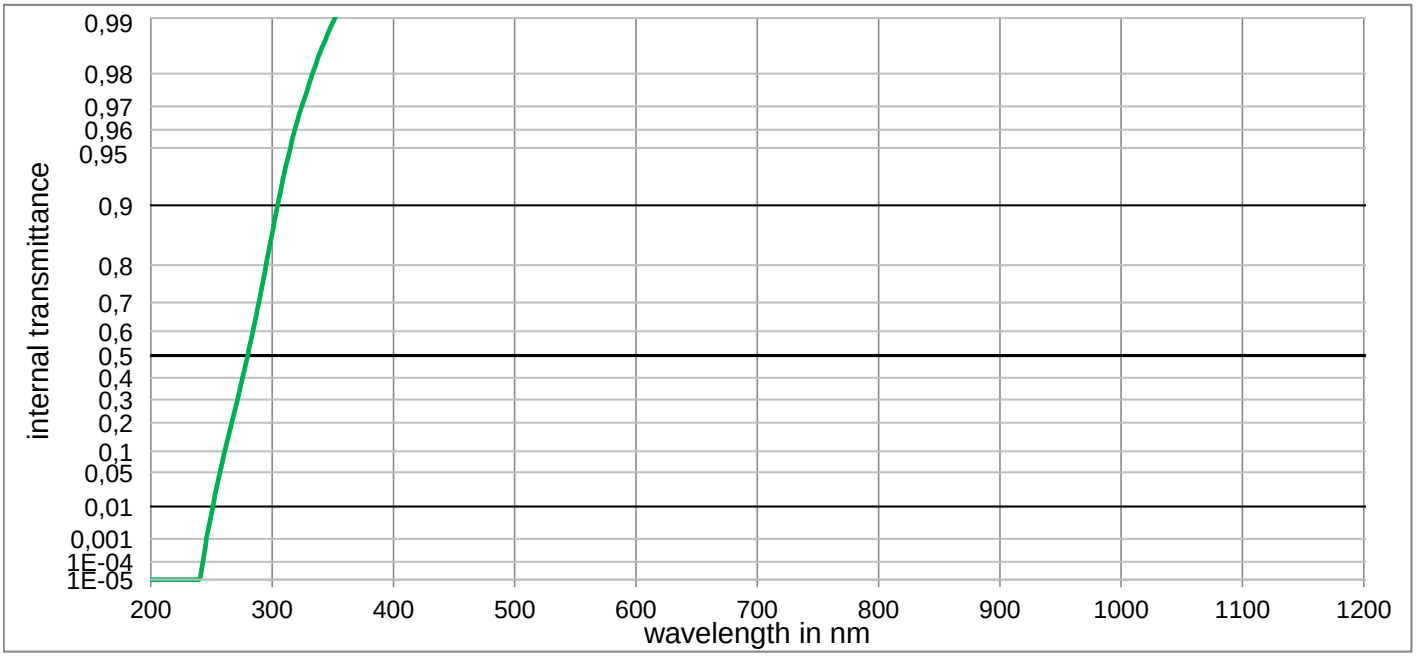
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d = | 2,00 mm |
| **Density** | |
| ρ = | 2,51 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ = | 610 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class = | 0 |
| SR class = | 1 |
| AR class = | 2 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

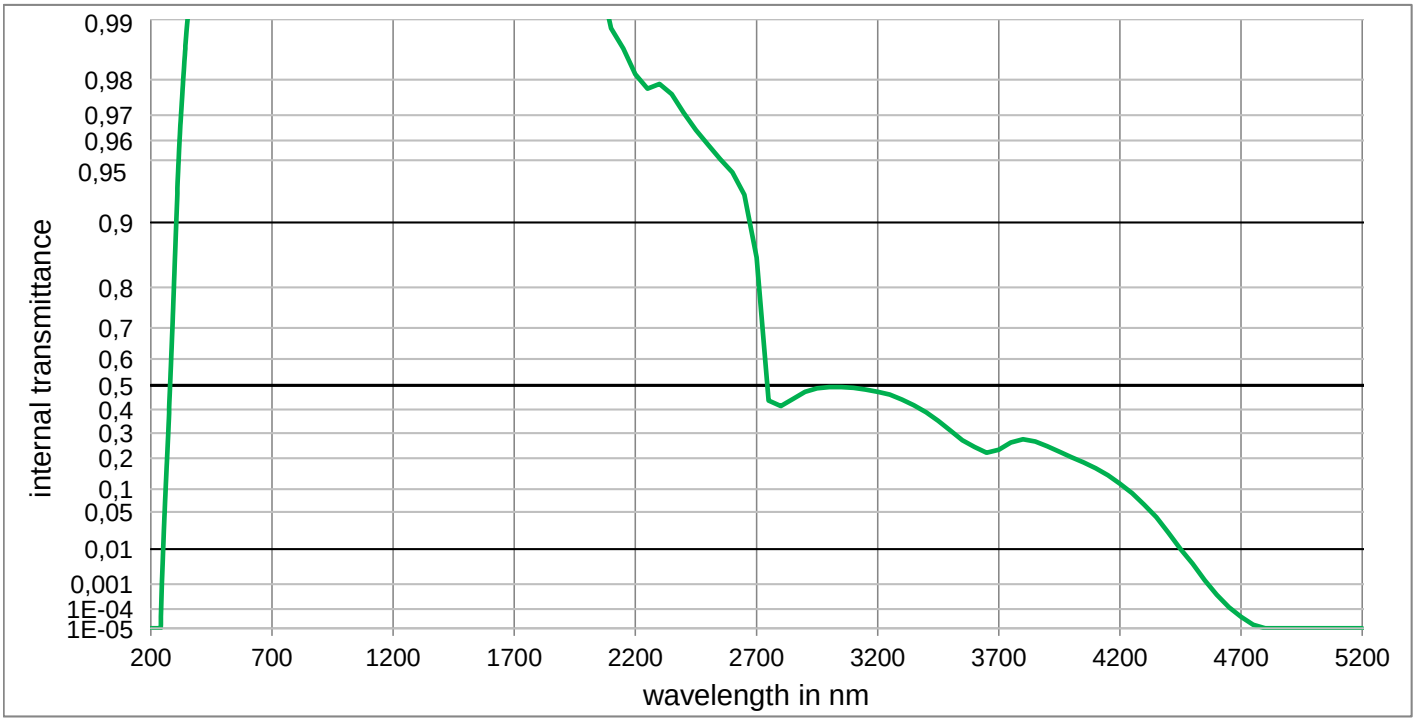
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| Base glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## N-WG280




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,974E-01 | 800 | 9,999E-01 | 1100 | 9,999E-01 | 2200 | 9,812E-01 | 3700 | 2,325E-01 |
| 210 | < 1,0E-05 | 510 | 9,976E-01 | 810 | 9,999E-01 | 1110 | 9,999E-01 | 2250 | 9,778E-01 | 3750 | 2,613E-01 |
| 220 | < 1,0E-05 | 520 | 9,978E-01 | 820 | 9,999E-01 | 1120 | 9,999E-01 | 2300 | 9,790E-01 | 3800 | 2,746E-01 |
| 230 | < 1,0E-05 | 530 | 9,980E-01 | 830 | 9,999E-01 | 1130 | 9,999E-01 | 2350 | 9,764E-01 | 3850 | 2,651E-01 |
| 240 | < 1,0E-05 | 540 | 9,982E-01 | 840 | 9,999E-01 | 1140 | 9,999E-01 | 2400 | 9,708E-01 | 3900 | 2,462E-01 |
| 250 | 6,6E-03 | 550 | 9,983E-01 | 850 | 9,999E-01 | 1150 | 9,999E-01 | 2450 | 9,645E-01 | 3950 | 2,245E-01 |
| 260 | 8,6E-02 | 560 | 9,985E-01 | 860 | 9,999E-01 | 1160 | 9,999E-01 | 2500 | 9,579E-01 | 4000 | 2,037E-01 |
| 270 | 2,7E-01 | 570 | 9,986E-01 | 870 | 9,999E-01 | 1170 | 9,999E-01 | 2550 | 9,507E-01 | 4050 | 1,843E-01 |
| 280 | 5,1E-01 | 580 | 9,988E-01 | 880 | 9,999E-01 | 1180 | 9,999E-01 | 2600 | 9,427E-01 | 4100 | 1,645E-01 |
| 290 | 7,2E-01 | 590 | 9,989E-01 | 890 | 9,999E-01 | 1190 | 9,999E-01 | 2650 | 9,264E-01 | 4150 | 1,408E-01 |
| 300 | 8,6E-01 | 600 | 9,991E-01 | 900 | 9,999E-01 | 1200 | 9,999E-01 | 2700 | 8,540E-01 | 4200 | 1,155E-01 |
| 310 | 9,3E-01 | 610 | 9,992E-01 | 910 | 9,999E-01 | 1250 | 9,999E-01 | 2750 | 4,381E-01 | 4250 | 8,980E-02 |
| 320 | 9,626E-01 | 620 | 9,993E-01 | 920 | 9,999E-01 | 1300 | 9,999E-01 | 2800 | 4,145E-01 | 4300 | 6,370E-02 |
| 330 | 9,766E-01 | 630 | 9,995E-01 | 930 | 9,999E-01 | 1350 | 9,999E-01 | 2850 | 4,442E-01 | 4350 | 4,140E-02 |
| 340 | 9,849E-01 | 640 | 9,996E-01 | 940 | 9,999E-01 | 1400 | 9,993E-01 | 2900 | 4,740E-01 | 4400 | 2,230E-02 |
| 350 | 9,894E-01 | 650 | 9,997E-01 | 950 | 9,999E-01 | 1450 | 9,999E-01 | 2950 | 4,882E-01 | 4450 | 1,000E-02 |
| 360 | 9,916E-01 | 660 | 9,998E-01 | 960 | 9,999E-01 | 1500 | 9,999E-01 | 3000 | 4,934E-01 | 4500 | 4,310E-03 |
| 370 | 9,928E-01 | 670 | 9,998E-01 | 970 | 9,999E-01 | 1550 | 9,999E-01 | 3050 | 4,934E-01 | 4550 | 1,352E-03 |
| 380 | 9,936E-01 | 680 | 9,999E-01 | 980 | 9,999E-01 | 1600 | 9,999E-01 | 3100 | 4,900E-01 | 4600 | 4,070E-04 |
| 390 | 9,942E-01 | 690 | 9,999E-01 | 990 | 9,999E-01 | 1650 | 9,999E-01 | 3150 | 4,835E-01 | 4650 | 1,191E-04 |
| 400 | 9,946E-01 | 700 | 9,999E-01 | 1000 | 9,999E-01 | 1700 | 9,999E-01 | 3200 | 4,740E-01 | 4700 | 4,227E-05 |
| 410 | 9,950E-01 | 710 | 9,999E-01 | 1010 | 9,999E-01 | 1750 | 9,999E-01 | 3250 | 4,622E-01 | 4750 | 1,585E-05 |
| 420 | 9,954E-01 | 720 | 9,999E-01 | 1020 | 9,999E-01 | 1800 | 9,999E-01 | 3300 | 4,423E-01 | 4800 | < 1,000E-05 |
| 430 | 9,957E-01 | 730 | 9,999E-01 | 1030 | 9,999E-01 | 1850 | 9,995E-01 | 3350 | 4,173E-01 | 4850 | < 1,000E-05 |
| 440 | 9,960E-01 | 740 | 9,999E-01 | 1040 | 9,999E-01 | 1900 | 9,984E-01 | 3400 | 3,885E-01 | 4900 | < 1,000E-05 |
| 450 | 9,962E-01 | 750 | 9,999E-01 | 1050 | 9,999E-01 | 1950 | 9,974E-01 | 3450 | 3,516E-01 | 4950 | < 1,000E-05 |
| 460 | 9,965E-01 | 760 | 9,999E-01 | 1060 | 9,999E-01 | 2000 | 9,961E-01 | 3500 | 3,114E-01 | 5000 | < 1,000E-05 |
| 470 | 9,967E-01 | 770 | 9,999E-01 | 1070 | 9,999E-01 | 2050 | 9,941E-01 | 3550 | 2,708E-01 | 5050 | < 1,000E-05 |
| 480 | 9,970E-01 | 780 | 9,999E-01 | 1080 | 9,999E-01 | 2100 | 9,889E-01 | 3600 | 2,429E-01 | 5100 | < 1,000E-05 |
| 490 | 9,972E-01 | 790 | 9,999E-01 | 1090 | 9,999E-01 | 2150 | 9,860E-01 | 3650 | 2,207E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## N-WG295

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,919 |
| **Spectral values guaranteed (d = 2 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 295 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 250 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,99) | = 400 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| valid from 440 nm to 1550 nm | |
| $B_1$ = | 0,7679 |
| $B_2$ = | 0,5097 |
| $B_3$ = | 1,4617 |
| $C_2$ = | 1,9688E-02 µm² |
| $C_3$ = | 100,000 µm² |
| **Internal quality** | |
| Bubble class | 1 |

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

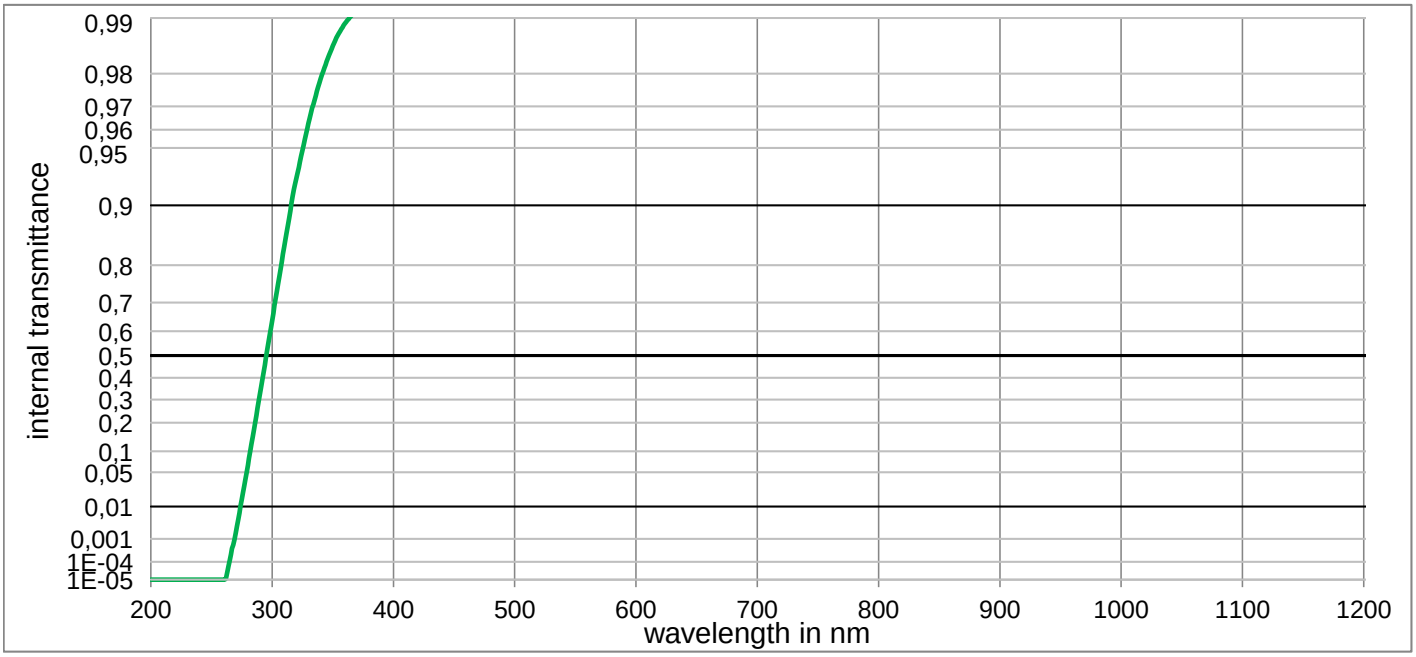
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = 565 °C | |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = 7,2 | |
| $\alpha_{(20°C/300°C)}$ | = 8,4 | |
| **Temperature coefficient** | | |
| Tk | = 0,06 | nm/K |

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 2 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

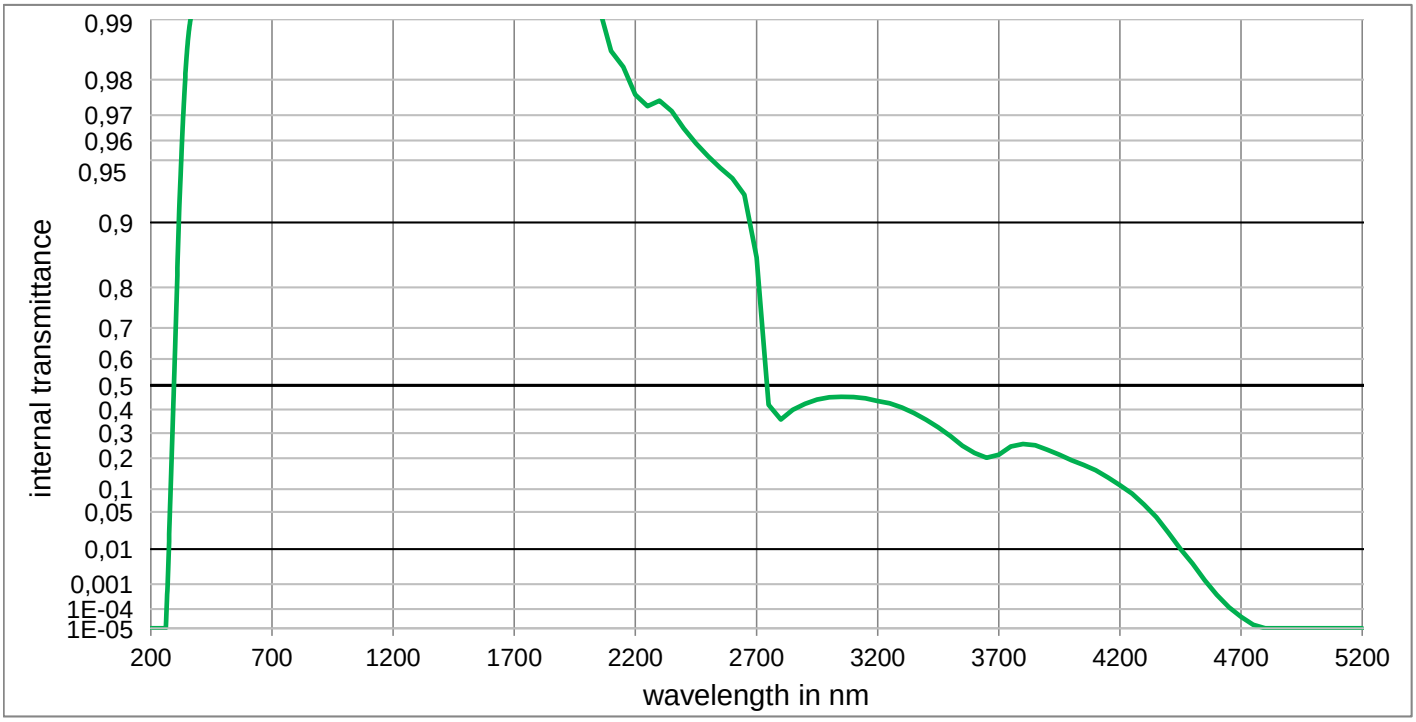
| Notes |
|---|
| |
| Base glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## N-WG295




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,966E-01 | 800 | 9,999E-01 | 1100 | 9,999E-01 | 2200 | 9,762E-01 | 3700 | 2,127E-01 |
| 210 | < 1,0E-05 | 510 | 9,968E-01 | 810 | 9,999E-01 | 1110 | 9,999E-01 | 2250 | 9,730E-01 | 3750 | 2,453E-01 |
| 220 | < 1,0E-05 | 520 | 9,971E-01 | 820 | 9,999E-01 | 1120 | 9,999E-01 | 2300 | 9,746E-01 | 3800 | 2,557E-01 |
| 230 | < 1,0E-05 | 530 | 9,973E-01 | 830 | 9,999E-01 | 1130 | 9,999E-01 | 2350 | 9,713E-01 | 3850 | 2,500E-01 |
| 240 | < 1,0E-05 | 540 | 9,975E-01 | 840 | 9,999E-01 | 1140 | 9,999E-01 | 2400 | 9,651E-01 | 3900 | 2,320E-01 |
| 250 | < 1,0E-05 | 550 | 9,977E-01 | 850 | 9,999E-01 | 1150 | 9,999E-01 | 2450 | 9,587E-01 | 3950 | 2,127E-01 |
| 260 | < 1,0E-05 | 560 | 9,978E-01 | 860 | 9,999E-01 | 1160 | 9,999E-01 | 2500 | 9,521E-01 | 4000 | 1,921E-01 |
| 270 | 1,6E-03 | 570 | 9,980E-01 | 870 | 9,999E-01 | 1170 | 9,999E-01 | 2550 | 9,455E-01 | 4050 | 1,753E-01 |
| 280 | 6,4E-02 | 580 | 9,981E-01 | 880 | 9,999E-01 | 1180 | 9,999E-01 | 2600 | 9,387E-01 | 4100 | 1,574E-01 |
| 290 | 3,3E-01 | 590 | 9,982E-01 | 890 | 9,999E-01 | 1190 | 9,999E-01 | 2650 | 9,264E-01 | 4150 | 1,342E-01 |
| 300 | 6,4E-01 | 600 | 9,984E-01 | 900 | 9,999E-01 | 1200 | 9,999E-01 | 2700 | 8,540E-01 | 4200 | 1,111E-01 |
| 310 | 8,4E-01 | 610 | 9,985E-01 | 910 | 9,999E-01 | 1250 | 9,999E-01 | 2750 | 4,197E-01 | 4250 | 8,840E-02 |
| 320 | 9,279E-01 | 620 | 9,986E-01 | 920 | 9,999E-01 | 1300 | 9,999E-01 | 2800 | 3,578E-01 | 4300 | 6,370E-02 |
| 330 | 9,630E-01 | 630 | 9,987E-01 | 930 | 9,999E-01 | 1350 | 9,999E-01 | 2850 | 3,992E-01 | 4350 | 4,140E-02 |
| 340 | 9,787E-01 | 640 | 9,988E-01 | 940 | 9,999E-01 | 1400 | 9,985E-01 | 2900 | 4,244E-01 | 4400 | 2,230E-02 |
| 350 | 9,859E-01 | 650 | 9,989E-01 | 950 | 9,999E-01 | 1450 | 9,999E-01 | 2950 | 4,419E-01 | 4450 | 1,000E-02 |
| 360 | 9,893E-01 | 660 | 9,991E-01 | 960 | 9,999E-01 | 1500 | 9,999E-01 | 3000 | 4,509E-01 | 4500 | 4,310E-03 |
| 370 | 9,909E-01 | 670 | 9,992E-01 | 970 | 9,999E-01 | 1550 | 9,999E-01 | 3050 | 4,537E-01 | 4550 | 1,352E-03 |
| 380 | 9,919E-01 | 680 | 9,993E-01 | 980 | 9,999E-01 | 1600 | 9,999E-01 | 3100 | 4,518E-01 | 4600 | 4,070E-04 |
| 390 | 9,928E-01 | 690 | 9,994E-01 | 990 | 9,999E-01 | 1650 | 9,999E-01 | 3150 | 4,466E-01 | 4650 | 1,191E-04 |
| 400 | 9,934E-01 | 700 | 9,995E-01 | 1000 | 9,999E-01 | 1700 | 9,999E-01 | 3200 | 4,357E-01 | 4700 | 4,227E-05 |
| 410 | 9,939E-01 | 710 | 9,996E-01 | 1010 | 9,999E-01 | 1750 | 9,997E-01 | 3250 | 4,258E-01 | 4750 | 1,585E-05 |
| 420 | 9,942E-01 | 720 | 9,997E-01 | 1020 | 9,999E-01 | 1800 | 9,988E-01 | 3300 | 4,088E-01 | 4800 | < 1,000E-05 |
| 430 | 9,946E-01 | 730 | 9,997E-01 | 1030 | 9,999E-01 | 1850 | 9,978E-01 | 3350 | 3,852E-01 | 4850 | < 1,000E-05 |
| 440 | 9,949E-01 | 740 | 9,998E-01 | 1040 | 9,999E-01 | 1900 | 9,965E-01 | 3400 | 3,568E-01 | 4900 | < 1,000E-05 |
| 450 | 9,951E-01 | 750 | 9,998E-01 | 1050 | 9,999E-01 | 1950 | 9,949E-01 | 3450 | 3,242E-01 | 4950 | < 1,000E-05 |
| 460 | 9,955E-01 | 760 | 9,999E-01 | 1060 | 9,999E-01 | 2000 | 9,932E-01 | 3500 | 2,878E-01 | 5000 | < 1,000E-05 |
| 470 | 9,957E-01 | 770 | 9,999E-01 | 1070 | 9,999E-01 | 2050 | 9,913E-01 | 3550 | 2,486E-01 | 5050 | < 1,000E-05 |
| 480 | 9,960E-01 | 780 | 9,999E-01 | 1080 | 9,999E-01 | 2100 | 9,856E-01 | 3600 | 2,200E-01 | 5100 | < 1,000E-05 |
| 490 | 9,963E-01 | 790 | 9,999E-01 | 1090 | 9,999E-01 | 2150 | 9,827E-01 | 3650 | 2,018E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## N-WG305

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 2 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 305 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 260 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,99) | = 420 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| valid from 440 nm to 1550 nm | |
| $B_1$ = | 1,2190 |
| $B_2$ = | 0,0699 |
| $B_3$ = | 106,2629 |
| $C_1$ = | 5,560E-03 µm² |
| $C_2$ = | 5,5370E-02 µm² |
| $C_3$ = | 10043,976 µm² |
| **Internal quality** | |
| Bubble class | 1 |

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

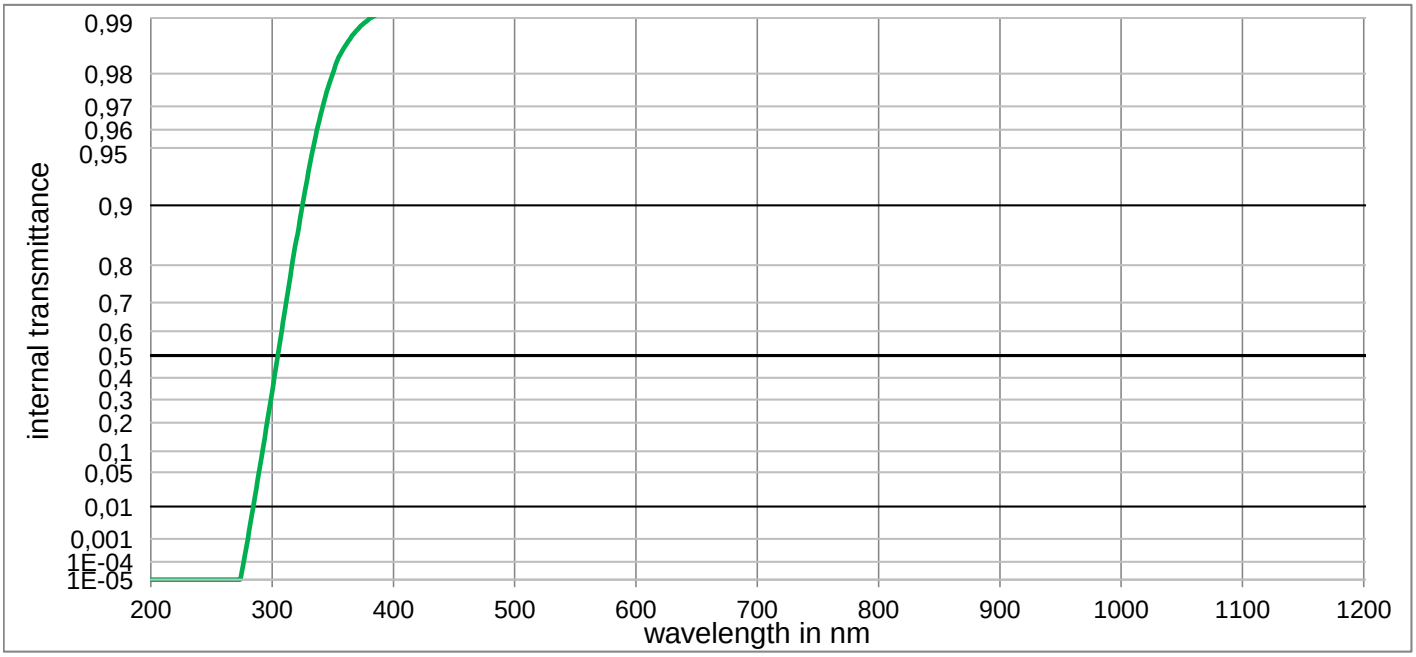
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = 562 °C | |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = 7,1 | |
| $\alpha_{(20°C/300°C)}$ | = 8,4 | |
| **Temperature coefficient** | | |
| Tk | = 0,06 | nm/K |

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 2 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

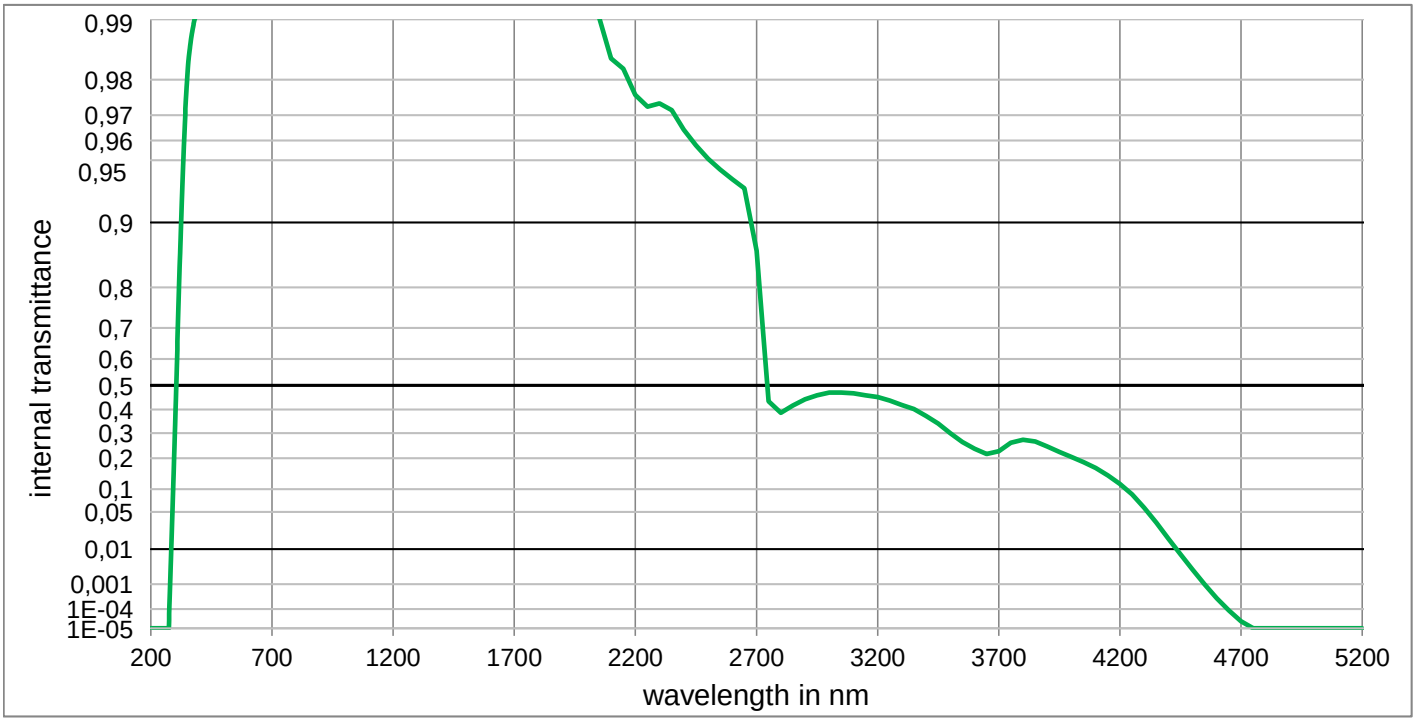
| Notes |
|---|
| |
| Base glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## N-WG305




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,949E-01 | 800 | 9,987E-01 | 1100 | 9,999E-01 | 2200 | 9,762E-01 | 3700 | 2,268E-01 |
| 210 | < 1,0E-05 | 510 | 9,952E-01 | 810 | 9,987E-01 | 1110 | 9,999E-01 | 2250 | 9,728E-01 | 3750 | 2,600E-01 |
| 220 | < 1,0E-05 | 520 | 9,954E-01 | 820 | 9,988E-01 | 1120 | 9,999E-01 | 2300 | 9,738E-01 | 3800 | 2,730E-01 |
| 230 | < 1,0E-05 | 530 | 9,957E-01 | 830 | 9,988E-01 | 1130 | 9,999E-01 | 2350 | 9,717E-01 | 3850 | 2,656E-01 |
| 240 | < 1,0E-05 | 540 | 9,959E-01 | 840 | 9,989E-01 | 1140 | 9,999E-01 | 2400 | 9,647E-01 | 3900 | 2,457E-01 |
| 250 | < 1,0E-05 | 550 | 9,961E-01 | 850 | 9,990E-01 | 1150 | 9,999E-01 | 2450 | 9,577E-01 | 3950 | 2,240E-01 |
| 260 | < 1,0E-05 | 560 | 9,962E-01 | 860 | 9,990E-01 | 1160 | 9,999E-01 | 2500 | 9,508E-01 | 4000 | 2,042E-01 |
| 270 | < 1,0E-05 | 570 | 9,964E-01 | 870 | 9,991E-01 | 1170 | 9,999E-01 | 2550 | 9,445E-01 | 4050 | 1,853E-01 |
| 280 | 1,0E-03 | 580 | 9,965E-01 | 880 | 9,991E-01 | 1180 | 9,999E-01 | 2600 | 9,380E-01 | 4100 | 1,650E-01 |
| 290 | 6,2E-02 | 590 | 9,967E-01 | 890 | 9,992E-01 | 1190 | 9,999E-01 | 2650 | 9,315E-01 | 4150 | 1,400E-01 |
| 300 | 3,4E-01 | 600 | 9,968E-01 | 900 | 9,993E-01 | 1200 | 9,999E-01 | 2700 | 8,640E-01 | 4200 | 1,144E-01 |
| 310 | 6,6E-01 | 610 | 9,970E-01 | 910 | 9,993E-01 | 1250 | 9,999E-01 | 2750 | 4,342E-01 | 4250 | 8,660E-02 |
| 320 | 8,507E-01 | 620 | 9,971E-01 | 920 | 9,994E-01 | 1300 | 9,999E-01 | 2800 | 3,856E-01 | 4300 | 5,780E-02 |
| 330 | 9,332E-01 | 630 | 9,972E-01 | 930 | 9,994E-01 | 1350 | 9,999E-01 | 2850 | 4,168E-01 | 4350 | 3,380E-02 |
| 340 | 9,668E-01 | 640 | 9,973E-01 | 940 | 9,995E-01 | 1400 | 9,970E-01 | 2900 | 4,433E-01 | 4400 | 1,700E-02 |
| 350 | 9,800E-01 | 650 | 9,975E-01 | 950 | 9,995E-01 | 1450 | 9,994E-01 | 2950 | 4,594E-01 | 4450 | 7,444E-03 |
| 360 | 9,857E-01 | 660 | 9,976E-01 | 960 | 9,996E-01 | 1500 | 9,999E-01 | 3000 | 4,707E-01 | 4500 | 2,938E-03 |
| 370 | 9,884E-01 | 670 | 9,977E-01 | 970 | 9,996E-01 | 1550 | 9,999E-01 | 3050 | 4,707E-01 | 4550 | 9,640E-04 |
| 380 | 9,899E-01 | 680 | 9,977E-01 | 980 | 9,997E-01 | 1600 | 9,999E-01 | 3100 | 4,679E-01 | 4600 | 2,931E-04 |
| 390 | 9,907E-01 | 690 | 9,978E-01 | 990 | 9,997E-01 | 1650 | 9,995E-01 | 3150 | 4,600E-01 | 4650 | 8,511E-05 |
| 400 | 9,914E-01 | 700 | 9,979E-01 | 1000 | 9,998E-01 | 1700 | 9,988E-01 | 3200 | 4,518E-01 | 4700 | 2,483E-05 |
| 410 | 9,920E-01 | 710 | 9,980E-01 | 1010 | 9,998E-01 | 1750 | 9,979E-01 | 3250 | 4,376E-01 | 4750 | < 1,000E-05 |
| 420 | 9,924E-01 | 720 | 9,981E-01 | 1020 | 9,999E-01 | 1800 | 9,969E-01 | 3300 | 4,188E-01 | 4800 | < 1,000E-05 |
| 430 | 9,928E-01 | 730 | 9,982E-01 | 1030 | 9,999E-01 | 1850 | 9,958E-01 | 3350 | 4,017E-01 | 4850 | < 1,000E-05 |
| 440 | 9,931E-01 | 740 | 9,983E-01 | 1040 | 9,999E-01 | 1900 | 9,943E-01 | 3400 | 3,724E-01 | 4900 | < 1,000E-05 |
| 450 | 9,935E-01 | 750 | 9,983E-01 | 1050 | 9,999E-01 | 1950 | 9,927E-01 | 3450 | 3,401E-01 | 4950 | < 1,000E-05 |
| 460 | 9,937E-01 | 760 | 9,984E-01 | 1060 | 9,999E-01 | 2000 | 9,916E-01 | 3500 | 2,997E-01 | 5000 | < 1,000E-05 |
| 470 | 9,940E-01 | 770 | 9,985E-01 | 1070 | 9,999E-01 | 2050 | 9,902E-01 | 3550 | 2,637E-01 | 5050 | < 1,000E-05 |
| 480 | 9,943E-01 | 780 | 9,985E-01 | 1080 | 9,999E-01 | 2100 | 9,843E-01 | 3600 | 2,360E-01 | 5100 | < 1,000E-05 |
| 490 | 9,946E-01 | 790 | 9,986E-01 | 1090 | 9,999E-01 | 2150 | 9,824E-01 | 3650 | 2,164E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## N-WG320

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

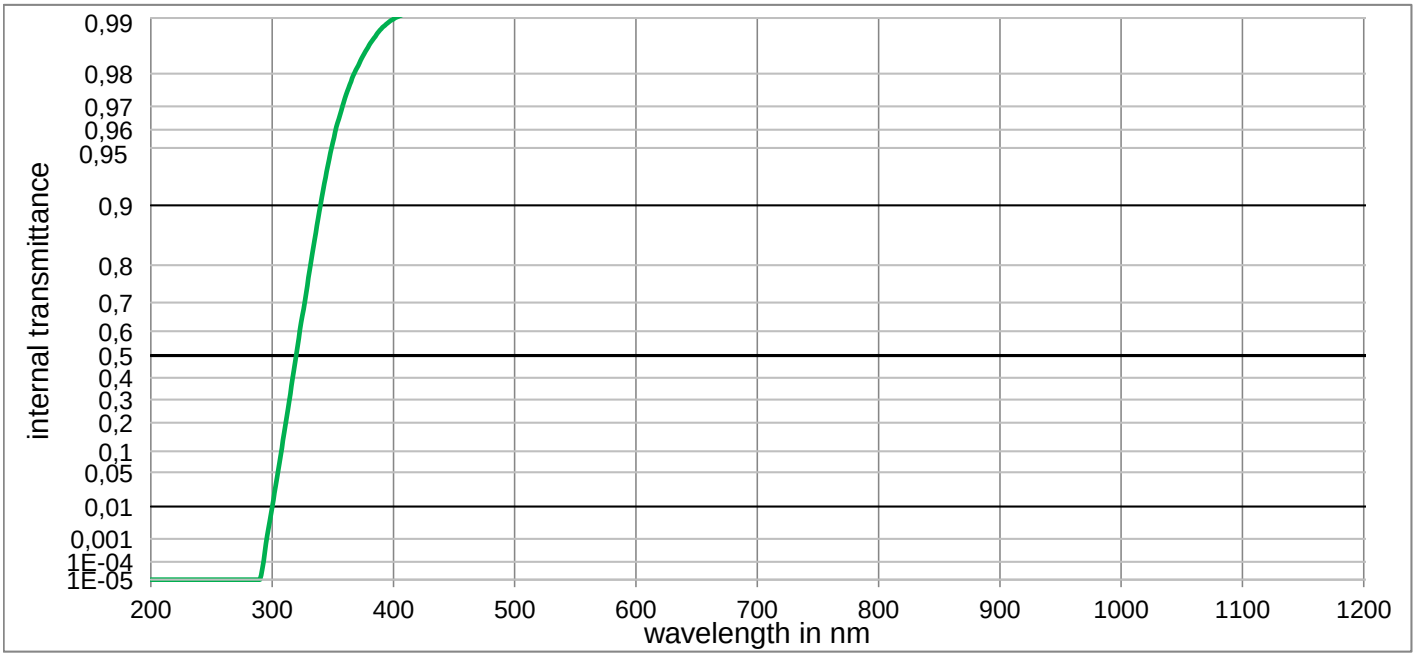
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d = | 2,00 mm |
| **Density** | |
| ρ = | 2,51 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ = | 610 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class = | 0 |
| SR class = | 1 |
| AR class = | 2 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

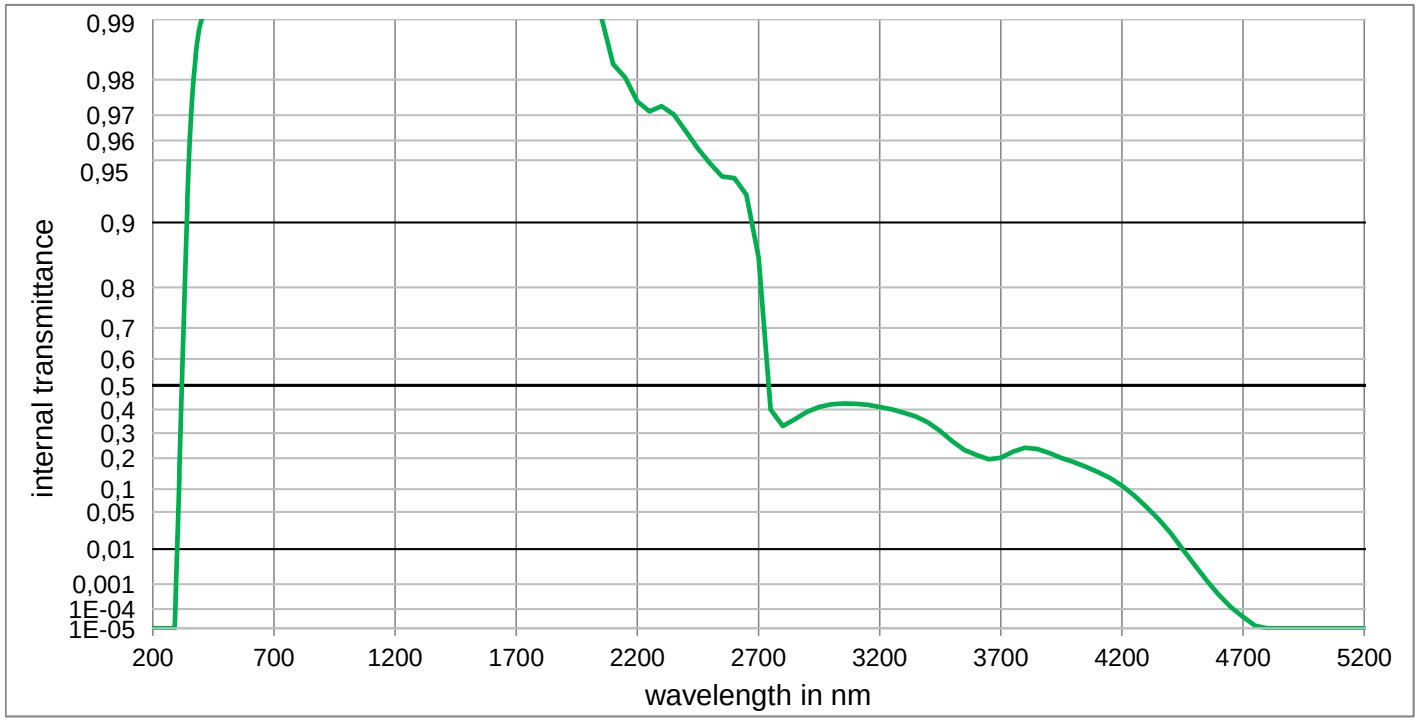
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| Base glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## N-WG320




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,940E-01 | 800 | 9,983E-01 | 1100 | 9,997E-01 | 2200 | 9,743E-01 | 3700 | 2,020E-01 |
| 210 | < 1,0E-05 | 510 | 9,942E-01 | 810 | 9,984E-01 | 1110 | 9,998E-01 | 2250 | 9,713E-01 | 3750 | 2,246E-01 |
| 220 | < 1,0E-05 | 520 | 9,945E-01 | 820 | 9,985E-01 | 1120 | 9,998E-01 | 2300 | 9,729E-01 | 3800 | 2,400E-01 |
| 230 | < 1,0E-05 | 530 | 9,948E-01 | 830 | 9,985E-01 | 1130 | 9,998E-01 | 2350 | 9,702E-01 | 3850 | 2,356E-01 |
| 240 | < 1,0E-05 | 540 | 9,950E-01 | 840 | 9,986E-01 | 1140 | 9,999E-01 | 2400 | 9,641E-01 | 3900 | 2,195E-01 |
| 250 | < 1,0E-05 | 550 | 9,953E-01 | 850 | 9,987E-01 | 1150 | 9,999E-01 | 2450 | 9,562E-01 | 3950 | 2,012E-01 |
| 260 | < 1,0E-05 | 560 | 9,955E-01 | 860 | 9,987E-01 | 1160 | 9,999E-01 | 2500 | 9,480E-01 | 4000 | 1,864E-01 |
| 270 | < 1,0E-05 | 570 | 9,957E-01 | 870 | 9,988E-01 | 1170 | 9,999E-01 | 2550 | 9,400E-01 | 4050 | 1,692E-01 |
| 280 | < 1,0E-05 | 580 | 9,959E-01 | 880 | 9,988E-01 | 1180 | 9,999E-01 | 2600 | 9,389E-01 | 4100 | 1,516E-01 |
| 290 | < 1,0E-05 | 590 | 9,960E-01 | 890 | 9,989E-01 | 1190 | 9,999E-01 | 2650 | 9,264E-01 | 4150 | 1,323E-01 |
| 300 | 9,6E-03 | 600 | 9,962E-01 | 900 | 9,989E-01 | 1200 | 9,999E-01 | 2700 | 8,540E-01 | 4200 | 1,092E-01 |
| 310 | 1,6E-01 | 610 | 9,964E-01 | 910 | 9,990E-01 | 1250 | 9,999E-01 | 2750 | 4,000E-01 | 4250 | 8,440E-02 |
| 320 | 5,066E-01 | 620 | 9,965E-01 | 920 | 9,990E-01 | 1300 | 9,999E-01 | 2800 | 3,300E-01 | 4300 | 5,970E-02 |
| 330 | 7,700E-01 | 630 | 9,967E-01 | 930 | 9,990E-01 | 1350 | 9,999E-01 | 2850 | 3,585E-01 | 4350 | 3,896E-02 |
| 340 | 9,013E-01 | 640 | 9,968E-01 | 940 | 9,991E-01 | 1400 | 9,975E-01 | 2900 | 3,900E-01 | 4400 | 2,230E-02 |
| 350 | 9,533E-01 | 650 | 9,969E-01 | 950 | 9,991E-01 | 1450 | 9,999E-01 | 2950 | 4,109E-01 | 4450 | 1,000E-02 |
| 360 | 9,728E-01 | 660 | 9,970E-01 | 960 | 9,992E-01 | 1500 | 9,999E-01 | 3000 | 4,219E-01 | 4500 | 4,000E-03 |
| 370 | 9,814E-01 | 670 | 9,971E-01 | 970 | 9,992E-01 | 1550 | 9,999E-01 | 3050 | 4,249E-01 | 4550 | 1,318E-03 |
| 380 | 9,859E-01 | 680 | 9,972E-01 | 980 | 9,993E-01 | 1600 | 9,999E-01 | 3100 | 4,236E-01 | 4600 | 4,070E-04 |
| 390 | 9,885E-01 | 690 | 9,973E-01 | 990 | 9,993E-01 | 1650 | 9,999E-01 | 3150 | 4,194E-01 | 4650 | 1,191E-04 |
| 400 | 9,899E-01 | 700 | 9,974E-01 | 1000 | 9,993E-01 | 1700 | 9,998E-01 | 3200 | 4,100E-01 | 4700 | 4,227E-05 |
| 410 | 9,906E-01 | 710 | 9,975E-01 | 1010 | 9,994E-01 | 1750 | 9,990E-01 | 3250 | 4,011E-01 | 4750 | 1,390E-05 |
| 420 | 9,911E-01 | 720 | 9,976E-01 | 1020 | 9,994E-01 | 1800 | 9,980E-01 | 3300 | 3,864E-01 | 4800 | < 1,000E-05 |
| 430 | 9,916E-01 | 730 | 9,977E-01 | 1030 | 9,995E-01 | 1850 | 9,969E-01 | 3350 | 3,700E-01 | 4850 | < 1,000E-05 |
| 440 | 9,920E-01 | 740 | 9,978E-01 | 1040 | 9,995E-01 | 1900 | 9,957E-01 | 3400 | 3,450E-01 | 4900 | < 1,000E-05 |
| 450 | 9,924E-01 | 750 | 9,979E-01 | 1050 | 9,995E-01 | 1950 | 9,943E-01 | 3450 | 3,093E-01 | 4950 | < 1,000E-05 |
| 460 | 9,928E-01 | 760 | 9,980E-01 | 1060 | 9,996E-01 | 2000 | 9,930E-01 | 3500 | 2,669E-01 | 5000 | < 1,000E-05 |
| 470 | 9,931E-01 | 770 | 9,981E-01 | 1070 | 9,996E-01 | 2050 | 9,904E-01 | 3550 | 2,314E-01 | 5050 | < 1,000E-05 |
| 480 | 9,934E-01 | 780 | 9,982E-01 | 1080 | 9,996E-01 | 2100 | 9,833E-01 | 3600 | 2,120E-01 | 5100 | < 1,000E-05 |
| 490 | 9,937E-01 | 790 | 9,983E-01 | 1090 | 9,997E-01 | 2150 | 9,805E-01 | 3650 | 1,961E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## N-WG360

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

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

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1.0 |
| AR class | = 2.0 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

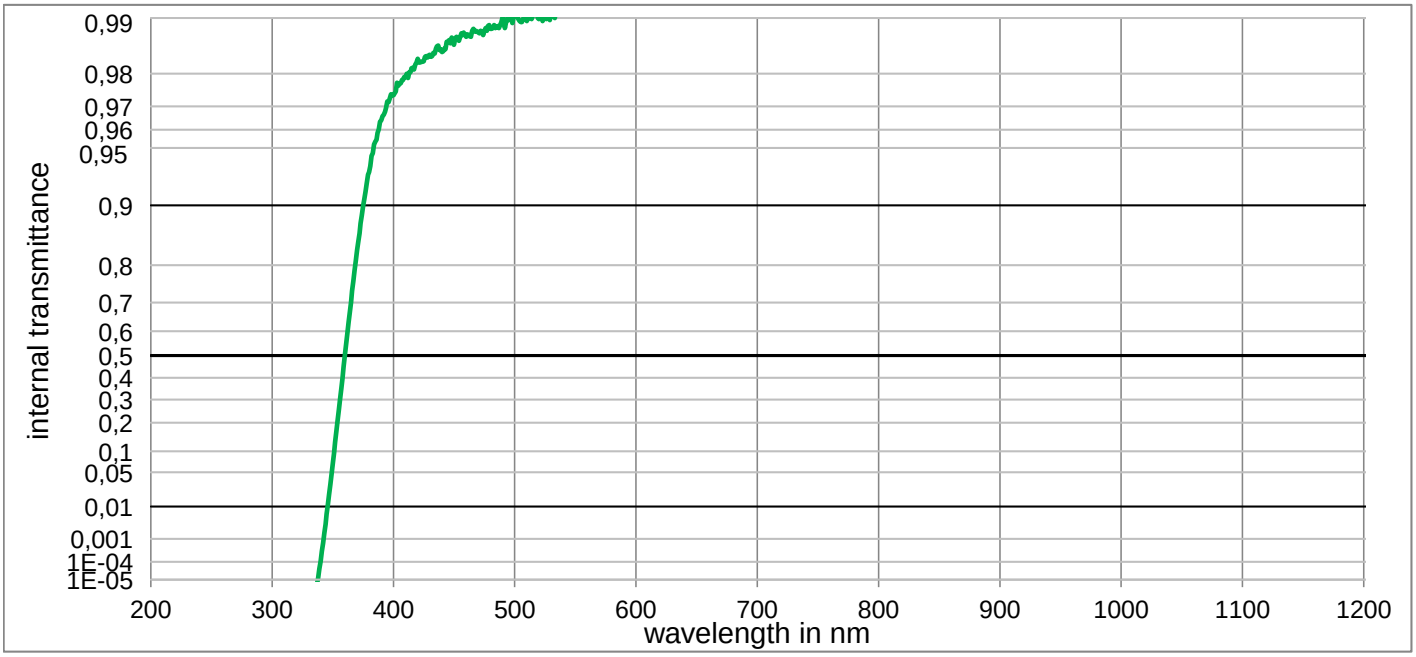
**Colormetric properties**

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

| Notes |
|---|
| |
| Longpass filter |
| |
| |
| DIN 58131 |
| identical to S8003N |

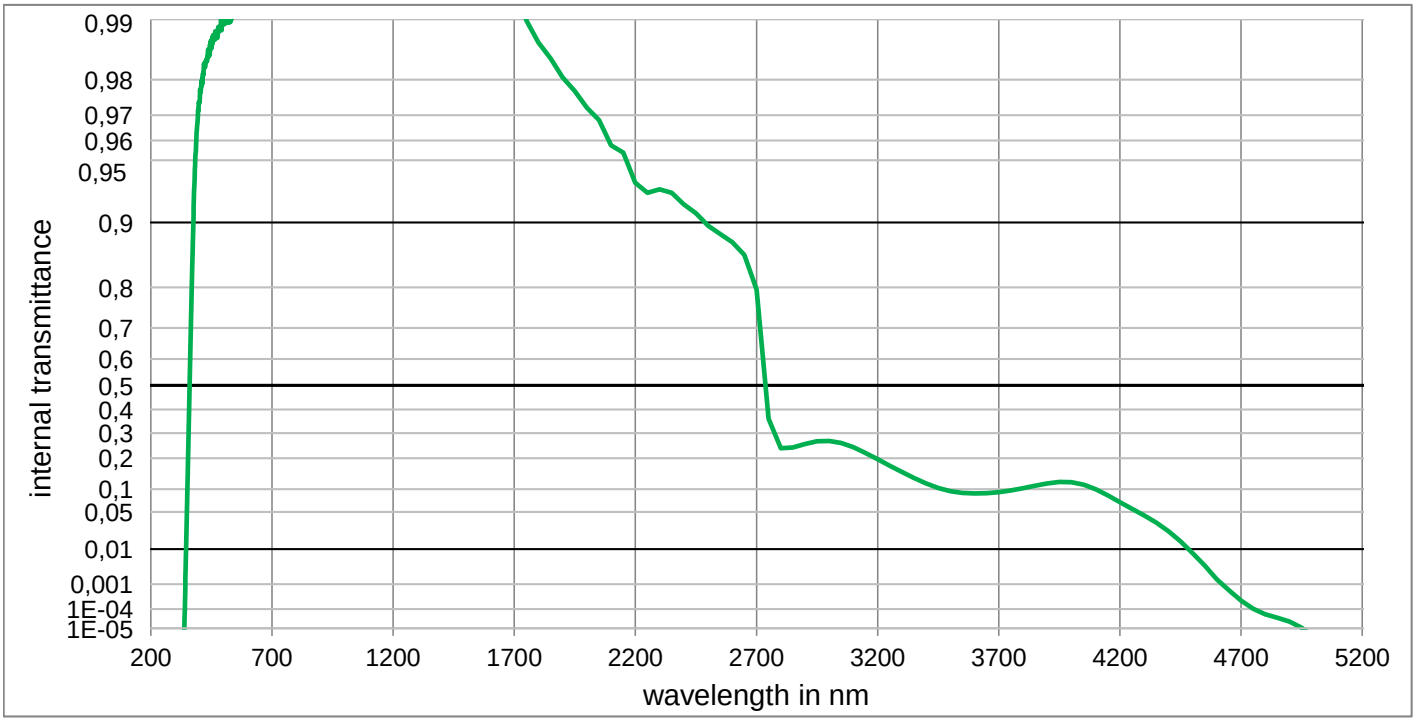
**Disclaimer**

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



# Data Sheet

## N-WG360




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,905E-01 | 800 | 9,965E-01 | 1100 | 9,974E-01 | 2200 | 9,357E-01 | 3700 | 9,206E-02 |
| 210 | < 1,0E-05 | 510 | 9,896E-01 | 810 | 9,946E-01 | 1110 | 9,970E-01 | 2250 | 9,281E-01 | 3750 | 9,647E-02 |
| 220 | < 1,0E-05 | 520 | 9,899E-01 | 820 | 9,954E-01 | 1120 | 9,965E-01 | 2300 | 9,308E-01 | 3800 | 1,023E-01 |
| 230 | < 1,0E-05 | 530 | 9,907E-01 | 830 | 9,921E-01 | 1130 | 9,974E-01 | 2350 | 9,279E-01 | 3850 | 1,092E-01 |
| 240 | < 1,0E-05 | 540 | 9,909E-01 | 840 | 9,979E-01 | 1140 | 9,967E-01 | 2400 | 9,181E-01 | 3900 | 1,158E-01 |
| 250 | < 1,0E-05 | 550 | 9,913E-01 | 850 | 9,985E-01 | 1150 | 9,975E-01 | 2450 | 9,097E-01 | 3950 | 1,200E-01 |
| 260 | < 1,0E-05 | 560 | 9,913E-01 | 860 | 9,952E-01 | 1160 | 9,970E-01 | 2500 | 8,964E-01 | 4000 | 1,195E-01 |
| 270 | < 1,0E-05 | 570 | 9,916E-01 | 870 | 9,962E-01 | 1170 | 9,974E-01 | 2550 | 8,866E-01 | 4050 | 1,127E-01 |
| 280 | < 1,0E-05 | 580 | 9,924E-01 | 880 | 9,942E-01 | 1180 | 9,979E-01 | 2600 | 8,759E-01 | 4100 | 9,989E-02 |
| 290 | < 1,0E-05 | 590 | 9,920E-01 | 890 | 9,952E-01 | 1190 | 9,975E-01 | 2650 | 8,577E-01 | 4150 | 8,423E-02 |
| 300 | < 1,0E-05 | 600 | 9,930E-01 | 900 | 9,961E-01 | 1200 | 9,974E-01 | 2700 | 7,951E-01 | 4200 | 6,895E-02 |
| 310 | < 1,0E-05 | 610 | 9,918E-01 | 910 | 9,971E-01 | 1250 | 9,975E-01 | 2750 | 3,602E-01 | 4250 | 5,560E-02 |
| 320 | < 1,000E-05 | 620 | 9,925E-01 | 920 | 9,965E-01 | 1300 | 9,975E-01 | 2800 | 2,381E-01 | 4300 | 4,425E-02 |
| 330 | < 1,000E-05 | 630 | 9,930E-01 | 930 | 9,967E-01 | 1350 | 9,969E-01 | 2850 | 2,411E-01 | 4350 | 3,377E-02 |
| 340 | 1,057E-04 | 640 | 9,933E-01 | 940 | 9,959E-01 | 1400 | 9,942E-01 | 2900 | 2,553E-01 | 4400 | 2,368E-02 |
| 350 | 6,888E-02 | 650 | 9,930E-01 | 950 | 9,961E-01 | 1450 | 9,954E-01 | 2950 | 2,659E-01 | 4450 | 1,477E-02 |
| 360 | 5,004E-01 | 660 | 9,937E-01 | 960 | 9,965E-01 | 1500 | 9,971E-01 | 3000 | 2,677E-01 | 4500 | 8,017E-03 |
| 370 | 8,309E-01 | 670 | 9,940E-01 | 970 | 9,959E-01 | 1550 | 9,971E-01 | 3050 | 2,591E-01 | 4550 | 3,770E-03 |
| 380 | 9,328E-01 | 680 | 9,941E-01 | 980 | 9,955E-01 | 1600 | 9,950E-01 | 3100 | 2,422E-01 | 4600 | 1,463E-03 |
| 390 | 9,644E-01 | 690 | 9,948E-01 | 990 | 9,953E-01 | 1650 | 9,952E-01 | 3150 | 2,198E-01 | 4650 | 5,978E-04 |
| 400 | 9,739E-01 | 700 | 9,944E-01 | 1000 | 9,969E-01 | 1700 | 9,937E-01 | 3200 | 1,960E-01 | 4700 | 2,356E-04 |
| 410 | 9,792E-01 | 710 | 9,953E-01 | 1010 | 9,967E-01 | 1750 | 9,899E-01 | 3250 | 1,727E-01 | 4750 | 1,034E-04 |
| 420 | 9,834E-01 | 720 | 9,957E-01 | 1020 | 9,969E-01 | 1800 | 9,870E-01 | 3300 | 1,514E-01 | 4800 | 5,671E-05 |
| 430 | 9,842E-01 | 730 | 9,952E-01 | 1030 | 9,966E-01 | 1850 | 9,843E-01 | 3350 | 1,324E-01 | 4850 | 3,765E-05 |
| 440 | 9,847E-01 | 740 | 9,959E-01 | 1040 | 9,975E-01 | 1900 | 9,805E-01 | 3400 | 1,163E-01 | 4900 | 2,374E-05 |
| 450 | 9,860E-01 | 750 | 9,944E-01 | 1050 | 9,970E-01 | 1950 | 9,772E-01 | 3450 | 1,035E-01 | 4950 | 1,069E-05 |
| 460 | 9,873E-01 | 760 | 9,958E-01 | 1060 | 9,971E-01 | 2000 | 9,724E-01 | 3500 | 9,490E-02 | 5000 | < 1,000E-05 |
| 470 | 9,880E-01 | 770 | 9,958E-01 | 1070 | 9,965E-01 | 2050 | 9,682E-01 | 3550 | 9,043E-02 | 5050 | < 1,000E-05 |
| 480 | 9,885E-01 | 780 | 9,952E-01 | 1080 | 9,969E-01 | 2100 | 9,577E-01 | 3600 | 8,906E-02 | 5100 | < 1,000E-05 |
| 490 | 9,901E-01 | 790 | 9,946E-01 | 1090 | 9,971E-01 | 2150 | 9,541E-01 | 3650 | 8,965E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## GG395

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 395 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 340 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,92) | = 480 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

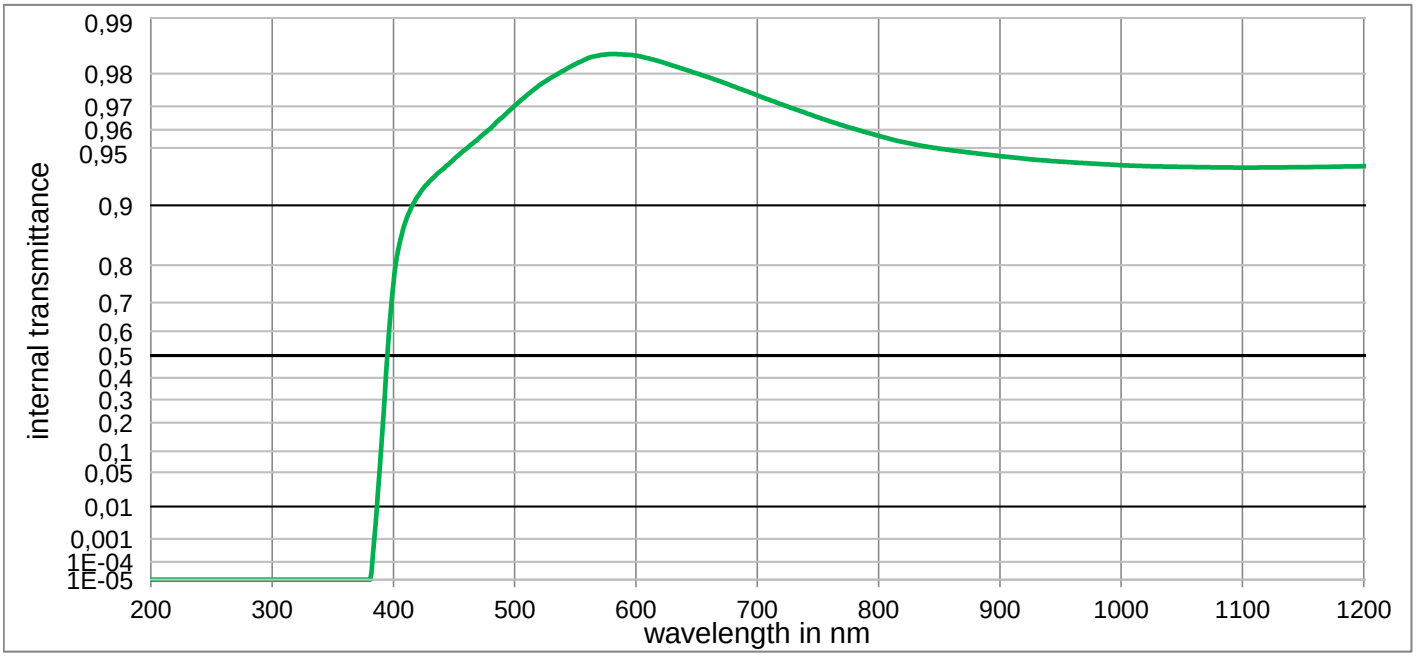
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,55 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 409 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

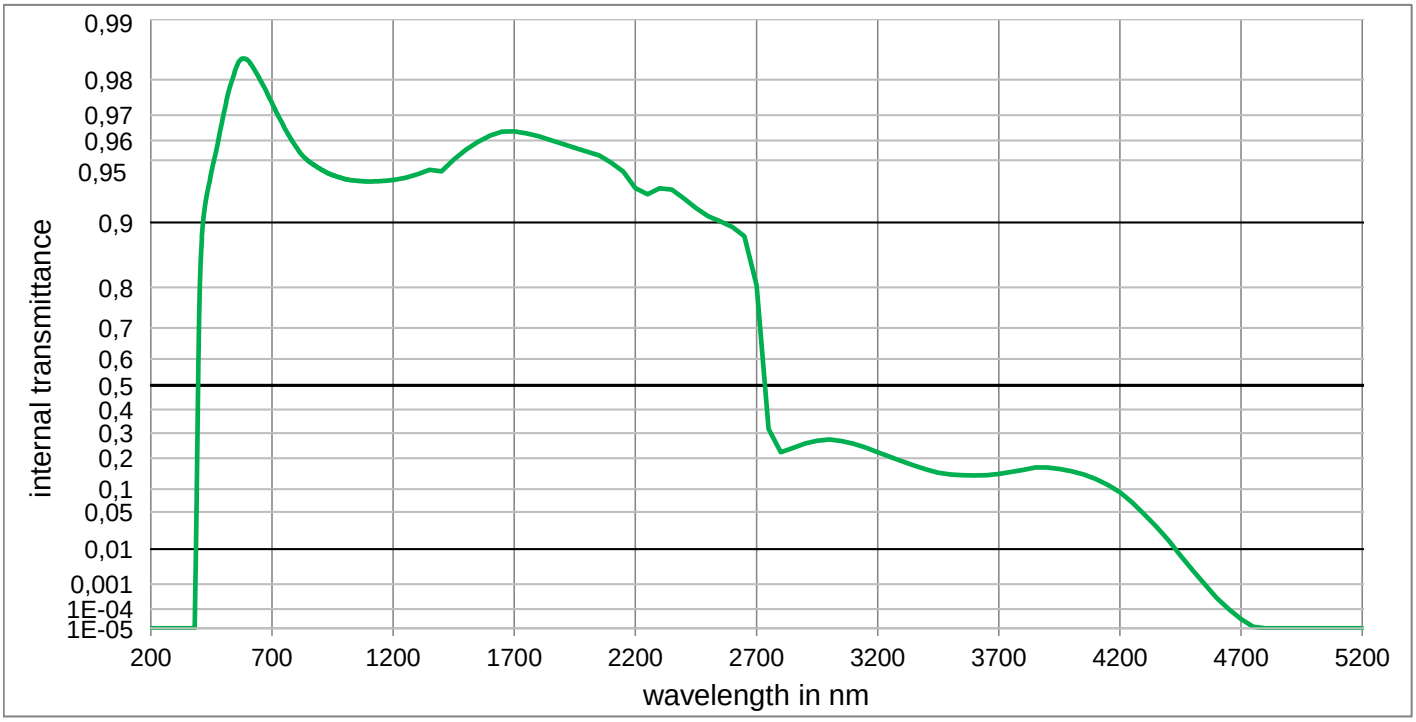
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,314 | 0,315 | 0,316 |
| | y | 0,331 | 0,332 | 0,334 |
| | Y | 91,1 | 90,5 | 89,8 |
| | $\lambda_d$ | 570 nm | 570 nm | 571 nm |
| | $P_e$ | 0,008 | 0,016 | 0,023 |
| Illuminant A | x | 0,448 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## GG395




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,703E-01 | 800 | 9,569E-01 | 1100 | 9,365E-01 | 2200 | 9,318E-01 | 3700 | 1,448E-01 |
| 210 | < 1,0E-05 | 510 | 9,738E-01 | 810 | 9,551E-01 | 1110 | 9,365E-01 | 2250 | 9,268E-01 | 3750 | 1,512E-01 |
| 220 | < 1,0E-05 | 520 | 9,768E-01 | 820 | 9,535E-01 | 1120 | 9,366E-01 | 2300 | 9,315E-01 | 3800 | 1,583E-01 |
| 230 | < 1,0E-05 | 530 | 9,789E-01 | 830 | 9,521E-01 | 1130 | 9,366E-01 | 2350 | 9,306E-01 | 3850 | 1,667E-01 |
| 240 | < 1,0E-05 | 540 | 9,807E-01 | 840 | 9,507E-01 | 1140 | 9,367E-01 | 2400 | 9,235E-01 | 3900 | 1,668E-01 |
| 250 | < 1,0E-05 | 550 | 9,823E-01 | 850 | 9,496E-01 | 1150 | 9,368E-01 | 2450 | 9,147E-01 | 3950 | 1,618E-01 |
| 260 | < 1,0E-05 | 560 | 9,835E-01 | 860 | 9,486E-01 | 1160 | 9,369E-01 | 2500 | 9,067E-01 | 4000 | 1,544E-01 |
| 270 | < 1,0E-05 | 570 | 9,841E-01 | 870 | 9,476E-01 | 1170 | 9,371E-01 | 2550 | 9,014E-01 | 4050 | 1,433E-01 |
| 280 | < 1,0E-05 | 580 | 9,843E-01 | 880 | 9,467E-01 | 1180 | 9,372E-01 | 2600 | 8,950E-01 | 4100 | 1,295E-01 |
| 290 | < 1,0E-05 | 590 | 9,842E-01 | 890 | 9,457E-01 | 1190 | 9,374E-01 | 2650 | 8,838E-01 | 4150 | 1,116E-01 |
| 300 | < 1,0E-05 | 600 | 9,840E-01 | 900 | 9,448E-01 | 1200 | 9,376E-01 | 2700 | 8,040E-01 | 4200 | 9,191E-02 |
| 310 | < 1,0E-05 | 610 | 9,835E-01 | 910 | 9,439E-01 | 1250 | 9,391E-01 | 2750 | 3,176E-01 | 4250 | 6,847E-02 |
| 320 | < 1,000E-05 | 620 | 9,828E-01 | 920 | 9,431E-01 | 1300 | 9,414E-01 | 2800 | 2,228E-01 | 4300 | 4,612E-02 |
| 330 | < 1,000E-05 | 630 | 9,819E-01 | 930 | 9,422E-01 | 1350 | 9,443E-01 | 2850 | 2,391E-01 | 4350 | 2,855E-02 |
| 340 | < 1,000E-05 | 640 | 9,810E-01 | 940 | 9,416E-01 | 1400 | 9,433E-01 | 2900 | 2,571E-01 | 4400 | 1,568E-02 |
| 350 | < 1,000E-05 | 650 | 9,801E-01 | 950 | 9,409E-01 | 1450 | 9,504E-01 | 2950 | 2,688E-01 | 4450 | 6,940E-03 |
| 360 | < 1,000E-05 | 660 | 9,791E-01 | 960 | 9,404E-01 | 1500 | 9,555E-01 | 3000 | 2,738E-01 | 4500 | 2,800E-03 |
| 370 | < 1,000E-05 | 670 | 9,779E-01 | 970 | 9,398E-01 | 1550 | 9,594E-01 | 3050 | 2,675E-01 | 4550 | 9,940E-04 |
| 380 | < 1,000E-05 | 680 | 9,766E-01 | 980 | 9,393E-01 | 1600 | 9,622E-01 | 3100 | 2,561E-01 | 4600 | 3,013E-04 |
| 390 | 1,131E-01 | 690 | 9,753E-01 | 990 | 9,388E-01 | 1650 | 9,638E-01 | 3150 | 2,409E-01 | 4650 | 9,863E-05 |
| 400 | 7,568E-01 | 700 | 9,739E-01 | 1000 | 9,383E-01 | 1700 | 9,640E-01 | 3200 | 2,224E-01 | 4700 | 3,281E-05 |
| 410 | 8,785E-01 | 710 | 9,723E-01 | 1010 | 9,379E-01 | 1750 | 9,632E-01 | 3250 | 2,055E-01 | 4750 | 1,227E-05 |
| 420 | 9,102E-01 | 720 | 9,708E-01 | 1020 | 9,376E-01 | 1800 | 9,619E-01 | 3300 | 1,892E-01 | 4800 | < 1,000E-05 |
| 430 | 9,252E-01 | 730 | 9,691E-01 | 1030 | 9,374E-01 | 1850 | 9,602E-01 | 3350 | 1,733E-01 | 4850 | < 1,000E-05 |
| 440 | 9,348E-01 | 740 | 9,675E-01 | 1040 | 9,372E-01 | 1900 | 9,585E-01 | 3400 | 1,601E-01 | 4900 | < 1,000E-05 |
| 450 | 9,427E-01 | 750 | 9,657E-01 | 1050 | 9,370E-01 | 1950 | 9,566E-01 | 3450 | 1,494E-01 | 4950 | < 1,000E-05 |
| 460 | 9,495E-01 | 760 | 9,639E-01 | 1060 | 9,369E-01 | 2000 | 9,546E-01 | 3500 | 1,437E-01 | 5000 | < 1,000E-05 |
| 470 | 9,553E-01 | 770 | 9,621E-01 | 1070 | 9,368E-01 | 2050 | 9,526E-01 | 3550 | 1,407E-01 | 5050 | < 1,000E-05 |
| 480 | 9,606E-01 | 780 | 9,604E-01 | 1080 | 9,366E-01 | 2100 | 9,487E-01 | 3600 | 1,403E-01 | 5100 | < 1,000E-05 |
| 490 | 9,658E-01 | 790 | 9,587E-01 | 1090 | 9,365E-01 | 2150 | 9,432E-01 | 3650 | 1,412E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## GG400

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 400 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 340 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 480 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

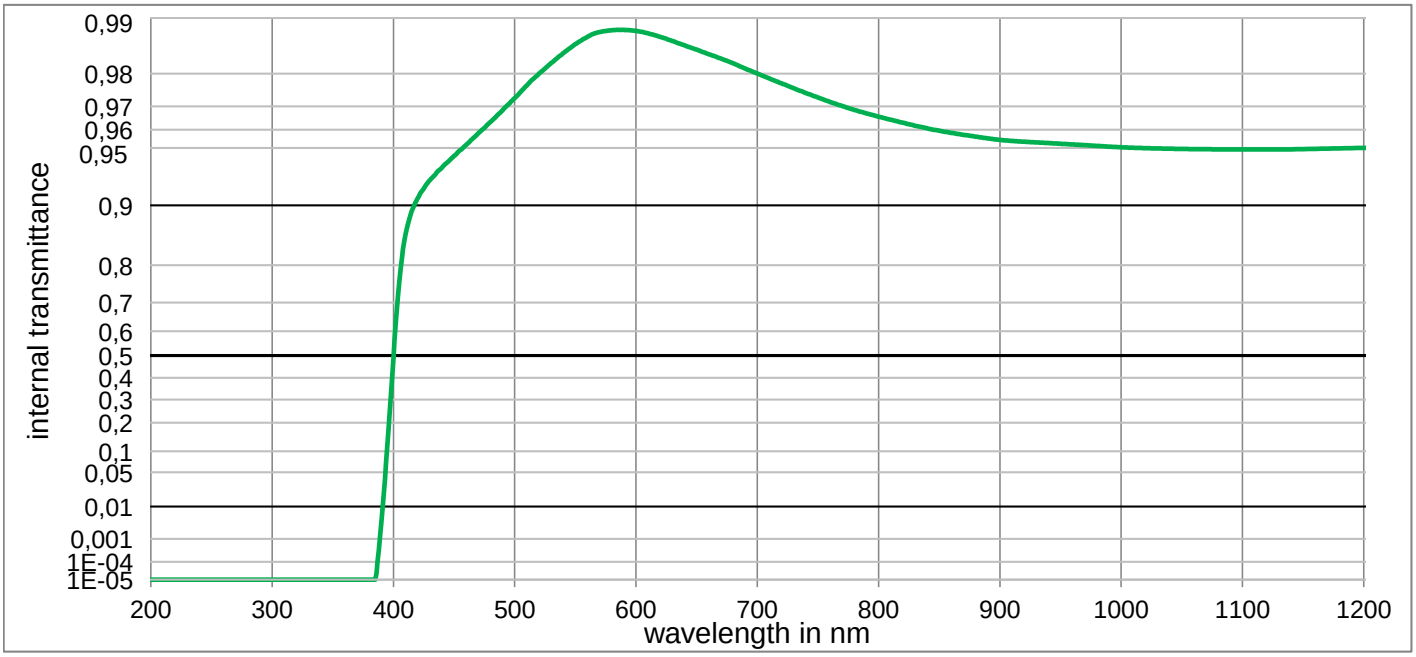
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,55 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 463 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

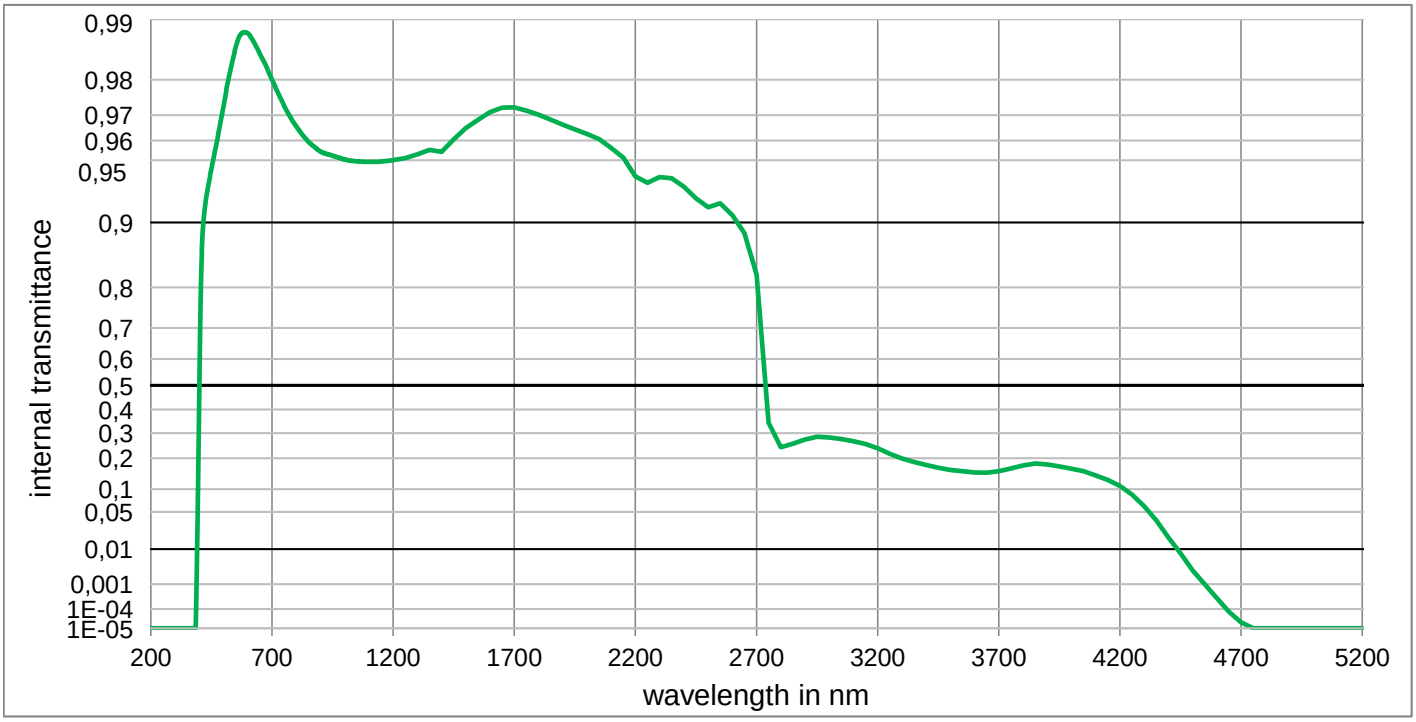
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,314 | 0,315 | 0,316 |
| | y | 0,331 | 0,333 | 0,335 |
| | Y | 91,2 | 90,7 | 90,2 |
| | $\lambda_d$ | 570 nm | 571 nm | 571 nm |
| | $P_e$ | 0,009 | 0,017 | 0,025 |
| Illuminant A | x | 0,448 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## GG400




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,729E-01 | 800 | 9,660E-01 | 1100 | 9,491E-01 | 2200 | 9,401E-01 | 3700 | 1,537E-01 |
| 210 | < 1,0E-05 | 510 | 9,769E-01 | 810 | 9,646E-01 | 1110 | 9,491E-01 | 2250 | 9,355E-01 | 3750 | 1,636E-01 |
| 220 | < 1,0E-05 | 520 | 9,800E-01 | 820 | 9,633E-01 | 1120 | 9,491E-01 | 2300 | 9,397E-01 | 3800 | 1,740E-01 |
| 230 | < 1,0E-05 | 530 | 9,825E-01 | 830 | 9,620E-01 | 1130 | 9,491E-01 | 2350 | 9,388E-01 | 3850 | 1,810E-01 |
| 240 | < 1,0E-05 | 540 | 9,845E-01 | 840 | 9,607E-01 | 1140 | 9,492E-01 | 2400 | 9,329E-01 | 3900 | 1,771E-01 |
| 250 | < 1,0E-05 | 550 | 9,861E-01 | 850 | 9,595E-01 | 1150 | 9,493E-01 | 2450 | 9,234E-01 | 3950 | 1,704E-01 |
| 260 | < 1,0E-05 | 560 | 9,873E-01 | 860 | 9,584E-01 | 1160 | 9,494E-01 | 2500 | 9,154E-01 | 4000 | 1,625E-01 |
| 270 | < 1,0E-05 | 570 | 9,881E-01 | 870 | 9,574E-01 | 1170 | 9,496E-01 | 2550 | 9,190E-01 | 4050 | 1,540E-01 |
| 280 | < 1,0E-05 | 580 | 9,883E-01 | 880 | 9,565E-01 | 1180 | 9,497E-01 | 2600 | 9,076E-01 | 4100 | 1,405E-01 |
| 290 | < 1,0E-05 | 590 | 9,884E-01 | 890 | 9,555E-01 | 1190 | 9,499E-01 | 2650 | 8,878E-01 | 4150 | 1,266E-01 |
| 300 | < 1,0E-05 | 600 | 9,883E-01 | 900 | 9,547E-01 | 1200 | 9,501E-01 | 2700 | 8,248E-01 | 4200 | 1,089E-01 |
| 310 | < 1,0E-05 | 610 | 9,879E-01 | 910 | 9,541E-01 | 1250 | 9,512E-01 | 2750 | 3,440E-01 | 4250 | 8,600E-02 |
| 320 | < 1,000E-05 | 620 | 9,874E-01 | 920 | 9,537E-01 | 1300 | 9,533E-01 | 2800 | 2,420E-01 | 4300 | 6,050E-02 |
| 330 | < 1,000E-05 | 630 | 9,867E-01 | 930 | 9,533E-01 | 1350 | 9,555E-01 | 2850 | 2,560E-01 | 4350 | 3,670E-02 |
| 340 | < 1,000E-05 | 640 | 9,859E-01 | 940 | 9,529E-01 | 1400 | 9,545E-01 | 2900 | 2,740E-01 | 4400 | 1,800E-02 |
| 350 | < 1,000E-05 | 650 | 9,852E-01 | 950 | 9,525E-01 | 1450 | 9,605E-01 | 2950 | 2,848E-01 | 4450 | 7,910E-03 |
| 360 | < 1,000E-05 | 660 | 9,843E-01 | 960 | 9,521E-01 | 1500 | 9,652E-01 | 3000 | 2,819E-01 | 4500 | 2,760E-03 |
| 370 | < 1,000E-05 | 670 | 9,834E-01 | 970 | 9,517E-01 | 1550 | 9,683E-01 | 3050 | 2,755E-01 | 4550 | 9,780E-04 |
| 380 | < 1,000E-05 | 680 | 9,824E-01 | 980 | 9,512E-01 | 1600 | 9,710E-01 | 3100 | 2,667E-01 | 4600 | 3,000E-04 |
| 390 | 3,430E-03 | 690 | 9,812E-01 | 990 | 9,508E-01 | 1650 | 9,725E-01 | 3150 | 2,557E-01 | 4650 | 7,345E-05 |
| 400 | 4,907E-01 | 700 | 9,800E-01 | 1000 | 9,504E-01 | 1700 | 9,725E-01 | 3200 | 2,381E-01 | 4700 | 2,171E-05 |
| 410 | 8,588E-01 | 710 | 9,788E-01 | 1010 | 9,501E-01 | 1750 | 9,715E-01 | 3250 | 2,170E-01 | 4750 | < 1,000E-05 |
| 420 | 9,082E-01 | 720 | 9,774E-01 | 1020 | 9,499E-01 | 1800 | 9,702E-01 | 3300 | 1,987E-01 | 4800 | < 1,000E-05 |
| 430 | 9,259E-01 | 730 | 9,760E-01 | 1030 | 9,497E-01 | 1850 | 9,684E-01 | 3350 | 1,864E-01 | 4850 | < 1,000E-05 |
| 440 | 9,365E-01 | 740 | 9,746E-01 | 1040 | 9,495E-01 | 1900 | 9,666E-01 | 3400 | 1,757E-01 | 4900 | < 1,000E-05 |
| 450 | 9,448E-01 | 750 | 9,731E-01 | 1050 | 9,494E-01 | 1950 | 9,648E-01 | 3450 | 1,659E-01 | 4950 | < 1,000E-05 |
| 460 | 9,518E-01 | 760 | 9,716E-01 | 1060 | 9,493E-01 | 2000 | 9,629E-01 | 3500 | 1,586E-01 | 5000 | < 1,000E-05 |
| 470 | 9,583E-01 | 770 | 9,702E-01 | 1070 | 9,492E-01 | 2050 | 9,606E-01 | 3550 | 1,536E-01 | 5050 | < 1,000E-05 |
| 480 | 9,636E-01 | 780 | 9,687E-01 | 1080 | 9,491E-01 | 2100 | 9,565E-01 | 3600 | 1,499E-01 | 5100 | < 1,000E-05 |
| 490 | 9,686E-01 | 790 | 9,673E-01 | 1090 | 9,491E-01 | 2150 | 9,515E-01 | 3650 | 1,493E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## GG420

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 420 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 360 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 530 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

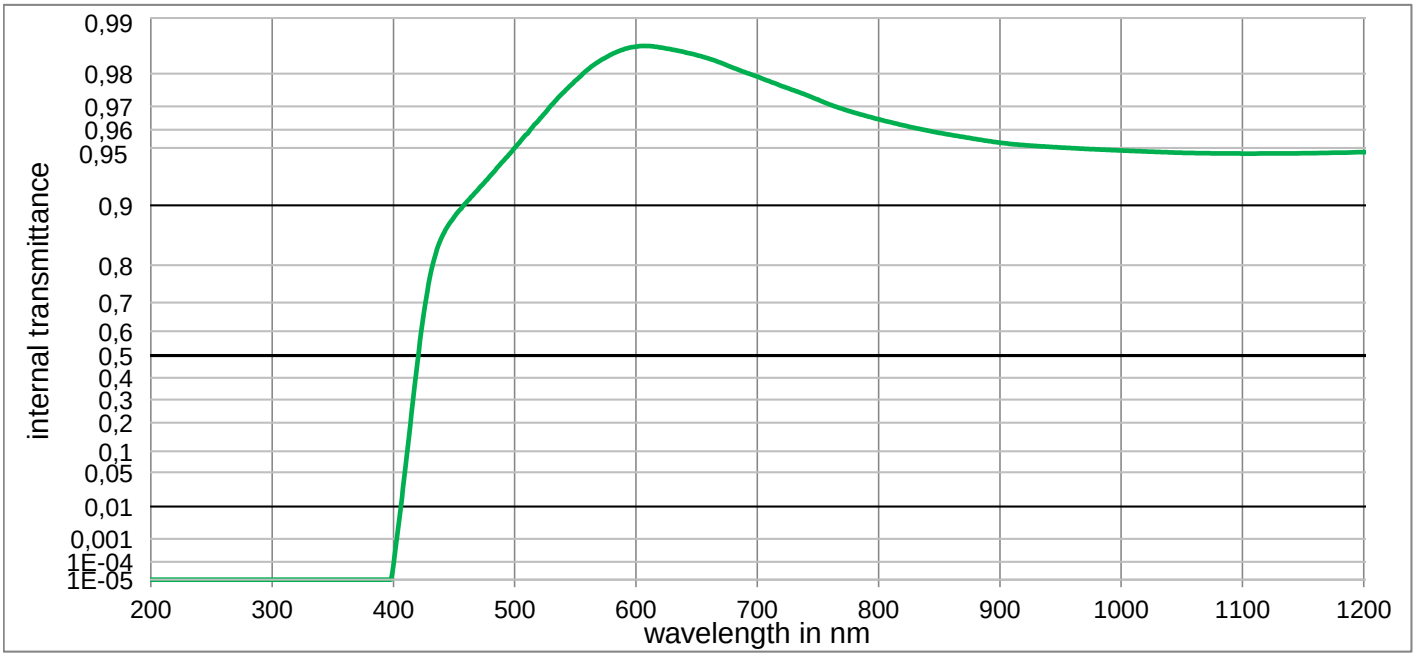
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,55 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 503 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

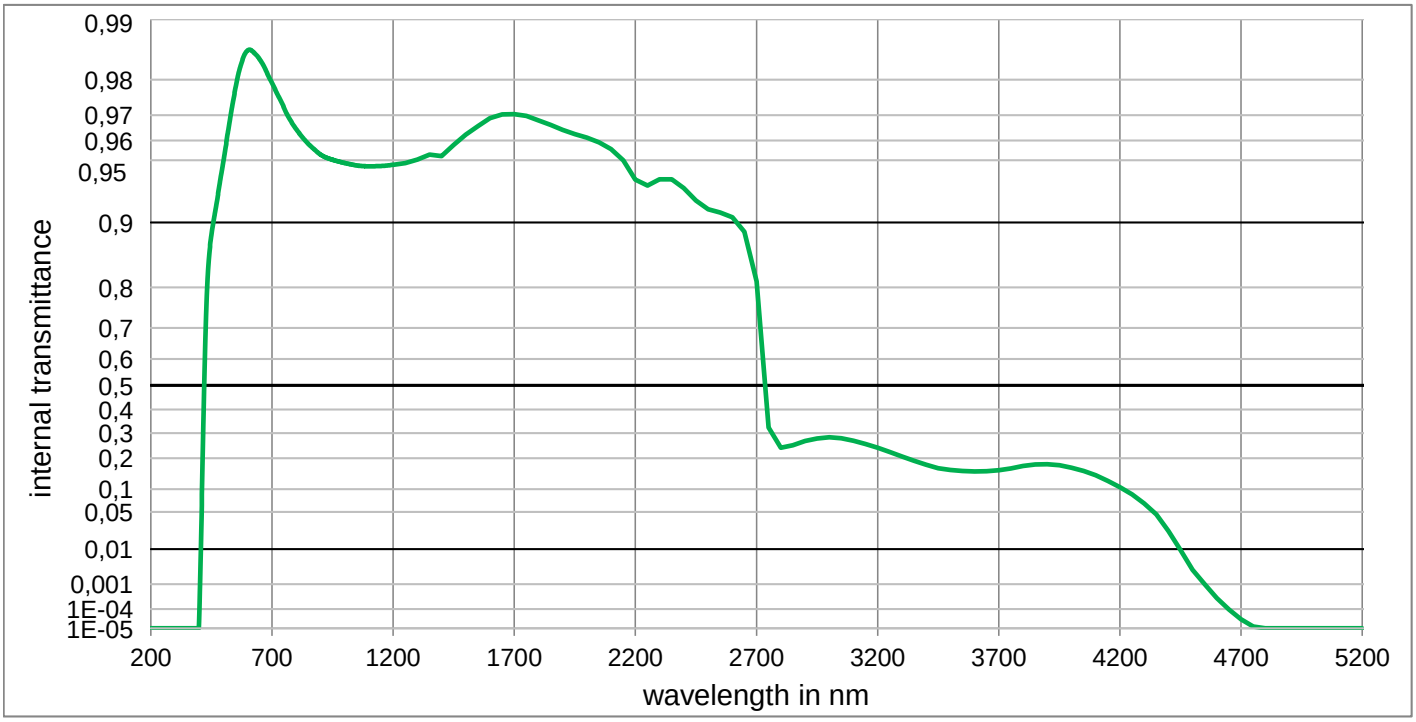
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,317 | 0,320 | 0,324 |
| | y | 0,337 | 0,342 | 0,348 |
| | Y | 90,9 | 90,1 | 89,2 |
| | $\lambda_d$ | 569 nm | 570 nm | 570 nm |
| | $P_e$ | 0,033 | 0,059 | 0,082 |
| Illuminant A | x | 0,450 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## GG420




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,500E-01 | 800 | 9,649E-01 | 1100 | 9,465E-01 | 2200 | 9,379E-01 | 3700 | 1,571E-01 |
| 210 | < 1,0E-05 | 510 | 9,578E-01 | 810 | 9,635E-01 | 1110 | 9,465E-01 | 2250 | 9,336E-01 | 3750 | 1,636E-01 |
| 220 | < 1,0E-05 | 520 | 9,645E-01 | 820 | 9,622E-01 | 1120 | 9,465E-01 | 2300 | 9,381E-01 | 3800 | 1,720E-01 |
| 230 | < 1,0E-05 | 530 | 9,703E-01 | 830 | 9,609E-01 | 1130 | 9,465E-01 | 2350 | 9,380E-01 | 3850 | 1,772E-01 |
| 240 | < 1,0E-05 | 540 | 9,747E-01 | 840 | 9,596E-01 | 1140 | 9,466E-01 | 2400 | 9,317E-01 | 3900 | 1,785E-01 |
| 250 | < 1,0E-05 | 550 | 9,781E-01 | 850 | 9,585E-01 | 1150 | 9,467E-01 | 2450 | 9,215E-01 | 3950 | 1,744E-01 |
| 260 | < 1,0E-05 | 560 | 9,809E-01 | 860 | 9,574E-01 | 1160 | 9,468E-01 | 2500 | 9,136E-01 | 4000 | 1,660E-01 |
| 270 | < 1,0E-05 | 570 | 9,829E-01 | 870 | 9,563E-01 | 1170 | 9,469E-01 | 2550 | 9,104E-01 | 4050 | 1,550E-01 |
| 280 | < 1,0E-05 | 580 | 9,843E-01 | 880 | 9,552E-01 | 1180 | 9,470E-01 | 2600 | 9,056E-01 | 4100 | 1,410E-01 |
| 290 | < 1,0E-05 | 590 | 9,852E-01 | 890 | 9,541E-01 | 1190 | 9,472E-01 | 2650 | 8,892E-01 | 4150 | 1,232E-01 |
| 300 | < 1,0E-05 | 600 | 9,857E-01 | 900 | 9,531E-01 | 1200 | 9,474E-01 | 2700 | 8,120E-01 | 4200 | 1,053E-01 |
| 310 | < 1,0E-05 | 610 | 9,858E-01 | 910 | 9,523E-01 | 1250 | 9,484E-01 | 2750 | 3,239E-01 | 4250 | 8,629E-02 |
| 320 | < 1,000E-05 | 620 | 9,856E-01 | 920 | 9,517E-01 | 1300 | 9,504E-01 | 2800 | 2,398E-01 | 4300 | 6,632E-02 |
| 330 | < 1,000E-05 | 630 | 9,852E-01 | 930 | 9,512E-01 | 1350 | 9,531E-01 | 2850 | 2,500E-01 | 4350 | 4,599E-02 |
| 340 | < 1,000E-05 | 640 | 9,847E-01 | 940 | 9,507E-01 | 1400 | 9,522E-01 | 2900 | 2,672E-01 | 4400 | 2,394E-02 |
| 350 | < 1,000E-05 | 650 | 9,841E-01 | 950 | 9,503E-01 | 1450 | 9,580E-01 | 2950 | 2,777E-01 | 4450 | 9,460E-03 |
| 360 | < 1,000E-05 | 660 | 9,834E-01 | 960 | 9,499E-01 | 1500 | 9,626E-01 | 3000 | 2,832E-01 | 4500 | 2,866E-03 |
| 370 | < 1,000E-05 | 670 | 9,825E-01 | 970 | 9,495E-01 | 1550 | 9,660E-01 | 3050 | 2,786E-01 | 4550 | 9,830E-04 |
| 380 | < 1,000E-05 | 680 | 9,814E-01 | 980 | 9,491E-01 | 1600 | 9,690E-01 | 3100 | 2,687E-01 | 4600 | 3,006E-04 |
| 390 | < 1,000E-05 | 690 | 9,803E-01 | 990 | 9,488E-01 | 1650 | 9,703E-01 | 3150 | 2,553E-01 | 4650 | 9,550E-05 |
| 400 | 7,048E-05 | 700 | 9,792E-01 | 1000 | 9,484E-01 | 1700 | 9,704E-01 | 3200 | 2,405E-01 | 4700 | 3,112E-05 |
| 410 | 6,112E-02 | 710 | 9,780E-01 | 1010 | 9,481E-01 | 1750 | 9,697E-01 | 3250 | 2,235E-01 | 4750 | 1,250E-05 |
| 420 | 4,792E-01 | 720 | 9,767E-01 | 1020 | 9,478E-01 | 1800 | 9,682E-01 | 3300 | 2,064E-01 | 4800 | < 1,000E-05 |
| 430 | 7,703E-01 | 730 | 9,754E-01 | 1030 | 9,475E-01 | 1850 | 9,665E-01 | 3350 | 1,911E-01 | 4850 | < 1,000E-05 |
| 440 | 8,551E-01 | 740 | 9,740E-01 | 1040 | 9,472E-01 | 1900 | 9,646E-01 | 3400 | 1,760E-01 | 4900 | < 1,000E-05 |
| 450 | 8,849E-01 | 750 | 9,724E-01 | 1050 | 9,470E-01 | 1950 | 9,628E-01 | 3450 | 1,639E-01 | 4950 | < 1,000E-05 |
| 460 | 9,032E-01 | 760 | 9,706E-01 | 1060 | 9,468E-01 | 2000 | 9,612E-01 | 3500 | 1,578E-01 | 5000 | < 1,000E-05 |
| 470 | 9,176E-01 | 770 | 9,691E-01 | 1070 | 9,467E-01 | 2050 | 9,591E-01 | 3550 | 1,551E-01 | 5050 | < 1,000E-05 |
| 480 | 9,300E-01 | 780 | 9,676E-01 | 1080 | 9,466E-01 | 2100 | 9,559E-01 | 3600 | 1,535E-01 | 5100 | < 1,000E-05 |
| 490 | 9,409E-01 | 790 | 9,662E-01 | 1090 | 9,465E-01 | 2150 | 9,500E-01 | 3650 | 1,540E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## GG435

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 435 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 370 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,92) | = 520 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

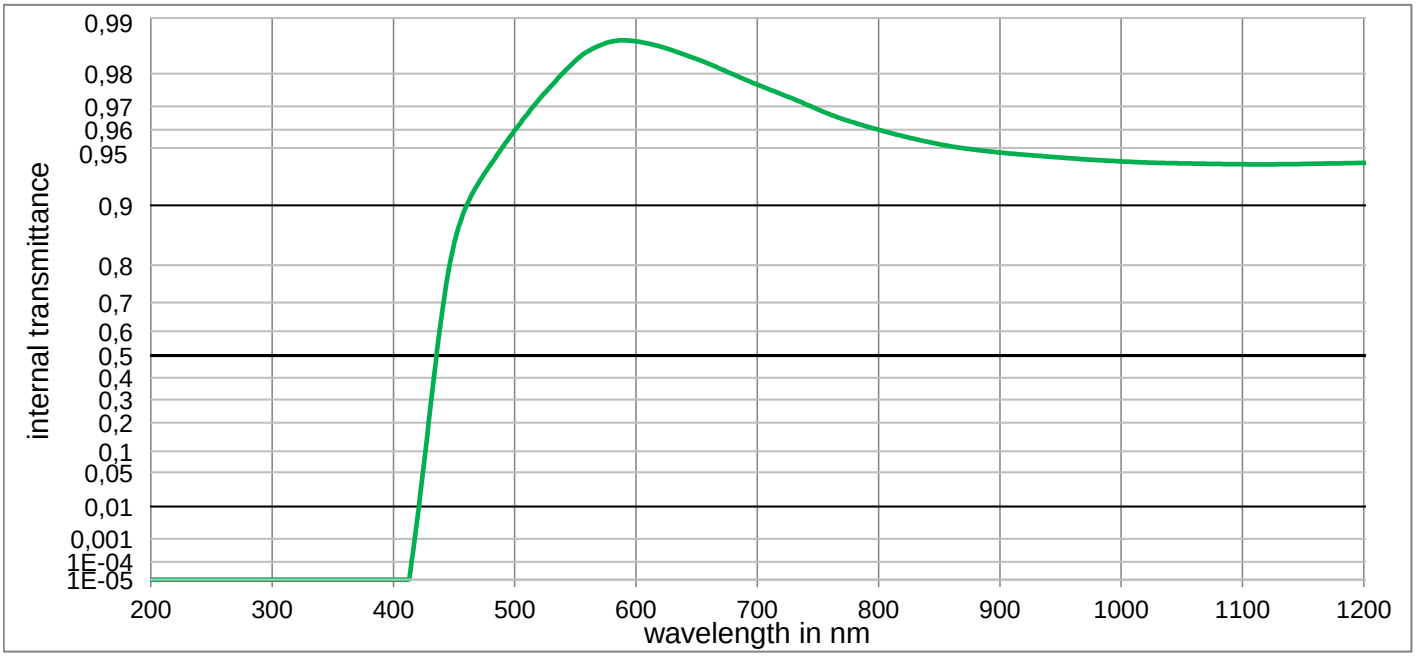
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,55 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 449 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

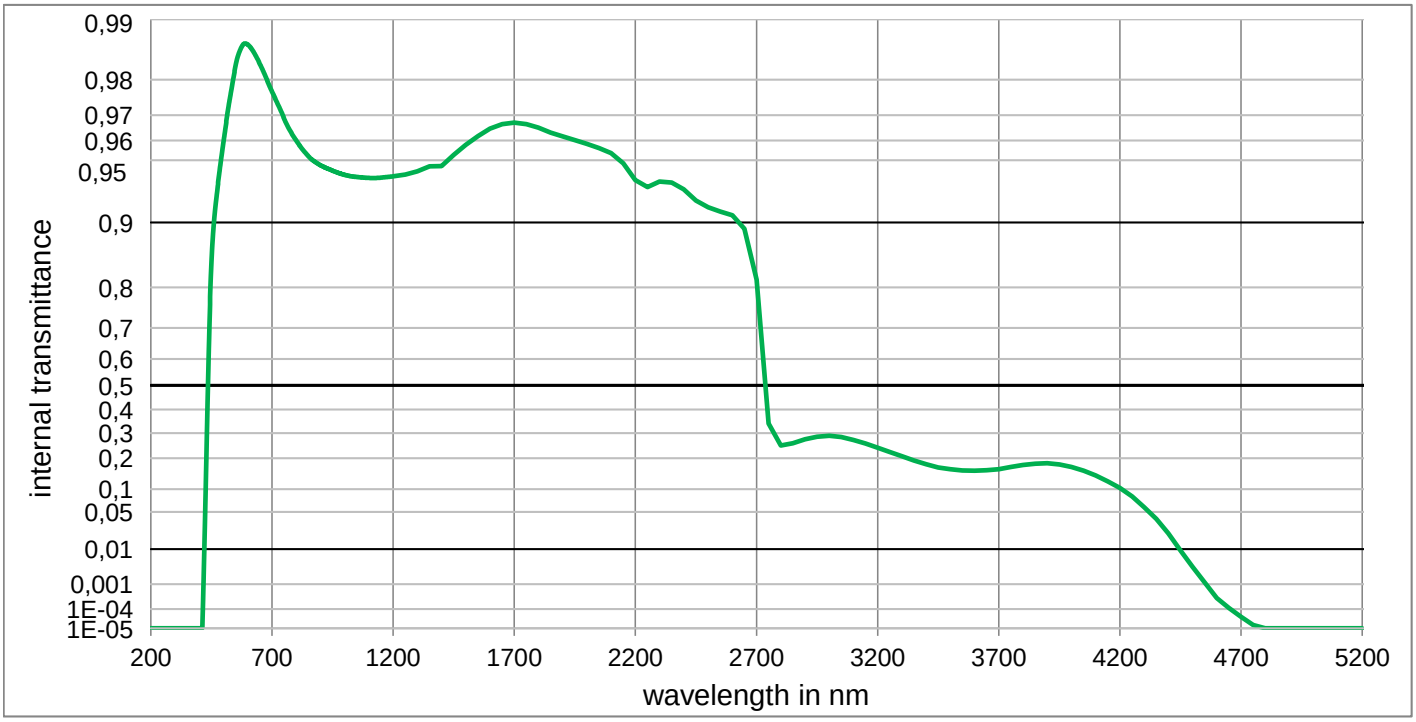
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,323 | 0,328 | 0,333 |
| | y | 0,350 | 0,361 | 0,369 |
| | Y | 90,9 | 90,2 | 89,5 |
| | $\lambda_d$ | 568 nm | 568 nm | 568 nm |
| | $P_e$ | 0,086 | 0,132 | 0,166 |
| Illuminant A | x | 0,453 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## GG435




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,596E-01 | 800 | 9,600E-01 | 1100 | 9,390E-01 | 2200 | 9,376E-01 | 3700 | 1,608E-01 |
| 210 | < 1,0E-05 | 510 | 9,667E-01 | 810 | 9,583E-01 | 1110 | 9,390E-01 | 2250 | 9,324E-01 | 3750 | 1,688E-01 |
| 220 | < 1,0E-05 | 520 | 9,724E-01 | 820 | 9,568E-01 | 1120 | 9,389E-01 | 2300 | 9,365E-01 | 3800 | 1,759E-01 |
| 230 | < 1,0E-05 | 530 | 9,767E-01 | 830 | 9,552E-01 | 1130 | 9,390E-01 | 2350 | 9,358E-01 | 3850 | 1,802E-01 |
| 240 | < 1,0E-05 | 540 | 9,802E-01 | 840 | 9,537E-01 | 1140 | 9,391E-01 | 2400 | 9,307E-01 | 3900 | 1,817E-01 |
| 250 | < 1,0E-05 | 550 | 9,829E-01 | 850 | 9,523E-01 | 1150 | 9,392E-01 | 2450 | 9,214E-01 | 3950 | 1,770E-01 |
| 260 | < 1,0E-05 | 560 | 9,848E-01 | 860 | 9,510E-01 | 1160 | 9,394E-01 | 2500 | 9,154E-01 | 4000 | 1,683E-01 |
| 270 | < 1,0E-05 | 570 | 9,859E-01 | 870 | 9,498E-01 | 1170 | 9,395E-01 | 2550 | 9,115E-01 | 4050 | 1,561E-01 |
| 280 | < 1,0E-05 | 580 | 9,866E-01 | 880 | 9,489E-01 | 1180 | 9,397E-01 | 2600 | 9,076E-01 | 4100 | 1,404E-01 |
| 290 | < 1,0E-05 | 590 | 9,868E-01 | 890 | 9,480E-01 | 1190 | 9,399E-01 | 2650 | 8,930E-01 | 4150 | 1,219E-01 |
| 300 | < 1,0E-05 | 600 | 9,866E-01 | 900 | 9,471E-01 | 1200 | 9,401E-01 | 2700 | 8,152E-01 | 4200 | 1,034E-01 |
| 310 | < 1,0E-05 | 610 | 9,862E-01 | 910 | 9,464E-01 | 1250 | 9,413E-01 | 2750 | 3,405E-01 | 4250 | 8,162E-02 |
| 320 | < 1,000E-05 | 620 | 9,857E-01 | 920 | 9,457E-01 | 1300 | 9,434E-01 | 2800 | 2,494E-01 | 4300 | 5,873E-02 |
| 330 | < 1,000E-05 | 630 | 9,850E-01 | 930 | 9,451E-01 | 1350 | 9,464E-01 | 2850 | 2,584E-01 | 4350 | 3,903E-02 |
| 340 | < 1,000E-05 | 640 | 9,842E-01 | 940 | 9,444E-01 | 1400 | 9,466E-01 | 2900 | 2,745E-01 | 4400 | 2,142E-02 |
| 350 | < 1,000E-05 | 650 | 9,833E-01 | 950 | 9,438E-01 | 1450 | 9,530E-01 | 2950 | 2,847E-01 | 4450 | 9,220E-03 |
| 360 | < 1,000E-05 | 660 | 9,823E-01 | 960 | 9,432E-01 | 1500 | 9,579E-01 | 3000 | 2,890E-01 | 4500 | 3,490E-03 |
| 370 | < 1,000E-05 | 670 | 9,811E-01 | 970 | 9,426E-01 | 1550 | 9,619E-01 | 3050 | 2,838E-01 | 4550 | 1,129E-03 |
| 380 | < 1,000E-05 | 680 | 9,799E-01 | 980 | 9,420E-01 | 1600 | 9,651E-01 | 3100 | 2,715E-01 | 4600 | 3,010E-04 |
| 390 | < 1,000E-05 | 690 | 9,785E-01 | 990 | 9,415E-01 | 1650 | 9,668E-01 | 3150 | 2,572E-01 | 4650 | 1,117E-04 |
| 400 | < 1,000E-05 | 700 | 9,771E-01 | 1000 | 9,411E-01 | 1700 | 9,673E-01 | 3200 | 2,407E-01 | 4700 | 4,207E-05 |
| 410 | < 1,000E-05 | 710 | 9,757E-01 | 1010 | 9,407E-01 | 1750 | 9,668E-01 | 3250 | 2,237E-01 | 4750 | 1,556E-05 |
| 420 | 5,714E-03 | 720 | 9,742E-01 | 1020 | 9,403E-01 | 1800 | 9,654E-01 | 3300 | 2,073E-01 | 4800 | < 1,000E-05 |
| 430 | 2,404E-01 | 730 | 9,726E-01 | 1030 | 9,401E-01 | 1850 | 9,634E-01 | 3350 | 1,920E-01 | 4850 | < 1,000E-05 |
| 440 | 6,640E-01 | 740 | 9,708E-01 | 1040 | 9,398E-01 | 1900 | 9,618E-01 | 3400 | 1,782E-01 | 4900 | < 1,000E-05 |
| 450 | 8,424E-01 | 750 | 9,689E-01 | 1050 | 9,397E-01 | 1950 | 9,602E-01 | 3450 | 1,665E-01 | 4950 | < 1,000E-05 |
| 460 | 8,986E-01 | 760 | 9,669E-01 | 1060 | 9,395E-01 | 2000 | 9,584E-01 | 3500 | 1,606E-01 | 5000 | < 1,000E-05 |
| 470 | 9,230E-01 | 770 | 9,650E-01 | 1070 | 9,394E-01 | 2050 | 9,564E-01 | 3550 | 1,567E-01 | 5050 | < 1,000E-05 |
| 480 | 9,386E-01 | 780 | 9,633E-01 | 1080 | 9,392E-01 | 2100 | 9,539E-01 | 3600 | 1,559E-01 | 5100 | < 1,000E-05 |
| 490 | 9,506E-01 | 790 | 9,616E-01 | 1090 | 9,391E-01 | 2150 | 9,482E-01 | 3650 | 1,573E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## GG455

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 455 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 390 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,92) | = 530 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

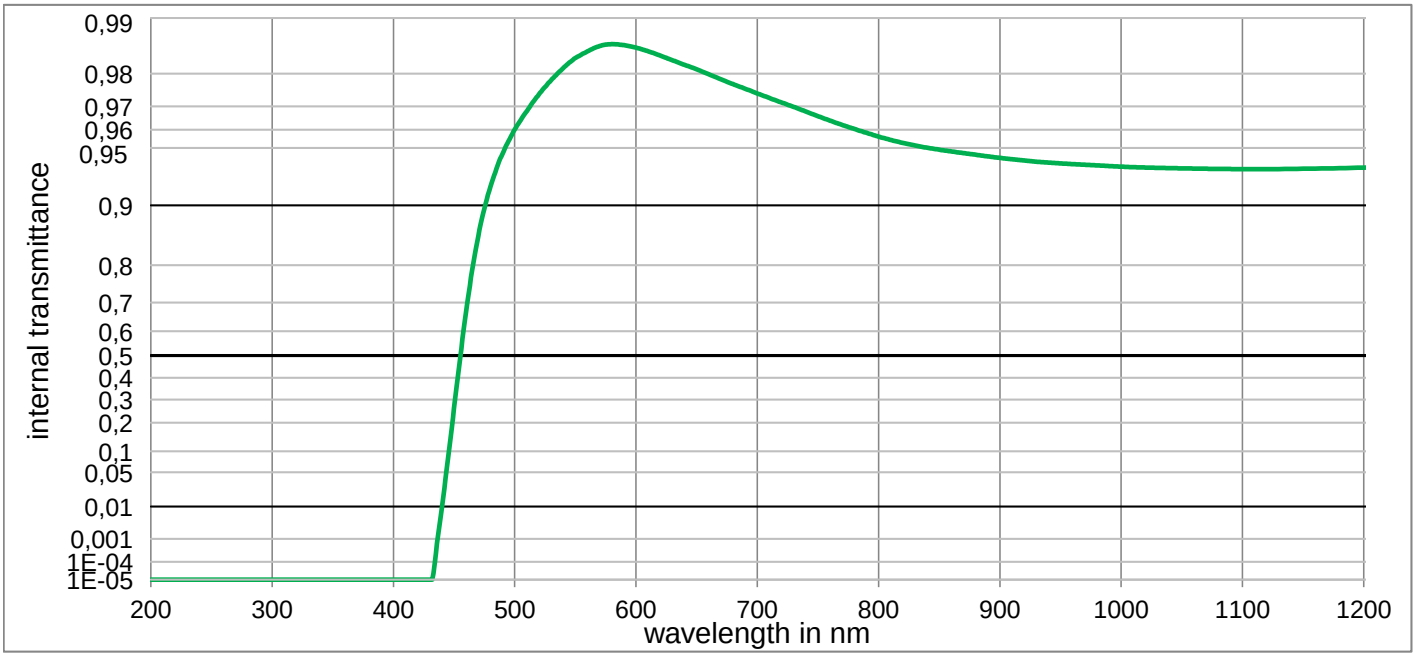
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = 3,00 mm | |
| **Density** | | |
| ρ | = 2,56 g/cm³ | |
| **Knoop hardness** | | |
| $HK_{[0.1/20]}$ | = 445 | |

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

| Chemical properties |
|---|
| **Chemical resistance** |
| FR class = 0 |
| SR class = 1 |
| AR class = 1 |
| **Resistance against humidity** |
| Resistant glass |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 |

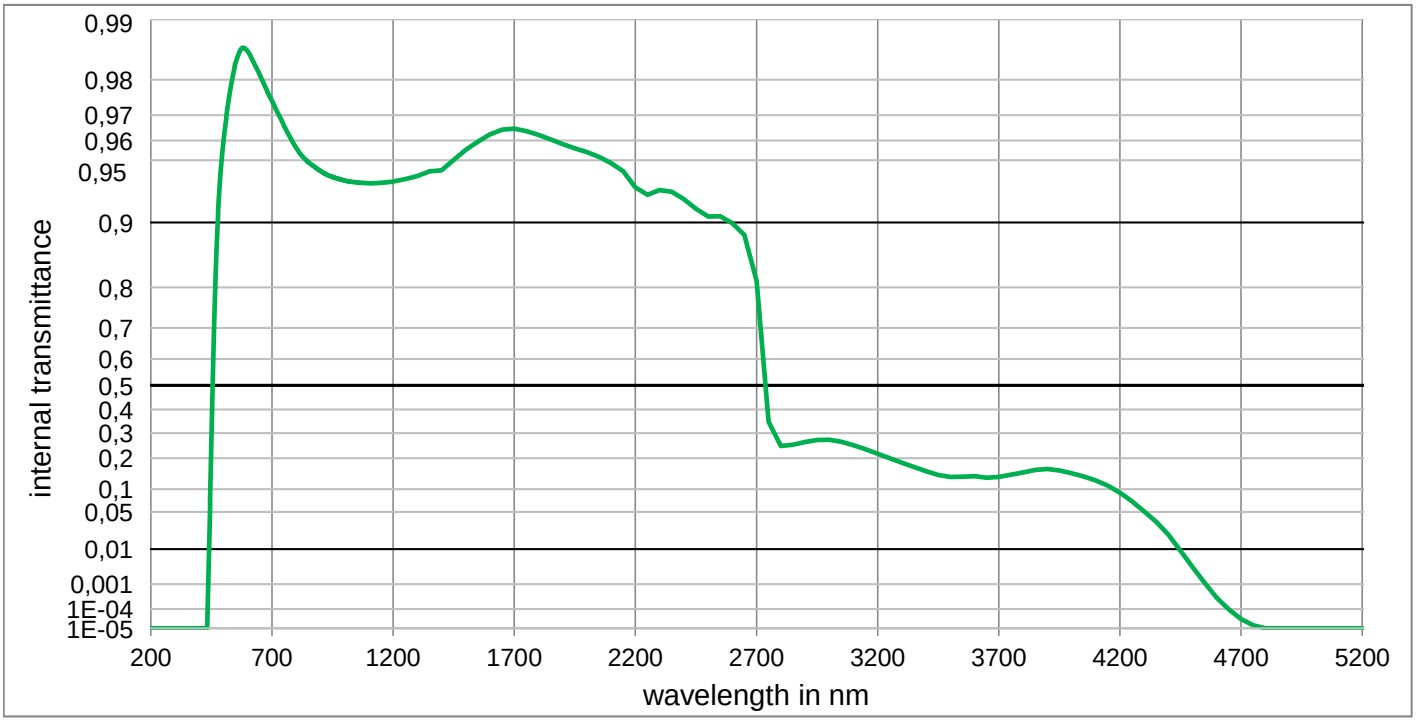
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,344 | 0,354 | 0,361 |
| | y | 0,394 | 0,414 | 0,426 |
| | Y | 90,5 | 89,7 | 88,9 |
| | $\lambda_d$ | 568 nm | 568 nm | 568 nm |
| | $P_e$ | 0,270 | 0,355 | 0,408 |
| Illuminant A | x | 0,465 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## GG455




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,600E-01 | 800 | 9,565E-01 | 1100 | 9,353E-01 | 2200 | 9,323E-01 | 3700 | 1,353E-01 |
| 210 | < 1,0E-05 | 510 | 9,681E-01 | 810 | 9,547E-01 | 1110 | 9,353E-01 | 2250 | 9,263E-01 | 3750 | 1,428E-01 |
| 220 | < 1,0E-05 | 520 | 9,741E-01 | 820 | 9,530E-01 | 1120 | 9,353E-01 | 2300 | 9,301E-01 | 3800 | 1,502E-01 |
| 230 | < 1,0E-05 | 530 | 9,783E-01 | 830 | 9,515E-01 | 1130 | 9,354E-01 | 2350 | 9,287E-01 | 3850 | 1,579E-01 |
| 240 | < 1,0E-05 | 540 | 9,813E-01 | 840 | 9,501E-01 | 1140 | 9,355E-01 | 2400 | 9,228E-01 | 3900 | 1,614E-01 |
| 250 | < 1,0E-05 | 550 | 9,835E-01 | 850 | 9,489E-01 | 1150 | 9,356E-01 | 2450 | 9,141E-01 | 3950 | 1,566E-01 |
| 260 | < 1,0E-05 | 560 | 9,848E-01 | 860 | 9,478E-01 | 1160 | 9,357E-01 | 2500 | 9,062E-01 | 4000 | 1,474E-01 |
| 270 | < 1,0E-05 | 570 | 9,858E-01 | 870 | 9,467E-01 | 1170 | 9,358E-01 | 2550 | 9,066E-01 | 4050 | 1,372E-01 |
| 280 | < 1,0E-05 | 580 | 9,861E-01 | 880 | 9,457E-01 | 1180 | 9,360E-01 | 2600 | 8,992E-01 | 4100 | 1,244E-01 |
| 290 | < 1,0E-05 | 590 | 9,860E-01 | 890 | 9,446E-01 | 1190 | 9,363E-01 | 2650 | 8,855E-01 | 4150 | 1,092E-01 |
| 300 | < 1,0E-05 | 600 | 9,855E-01 | 900 | 9,436E-01 | 1200 | 9,365E-01 | 2700 | 8,129E-01 | 4200 | 9,100E-02 |
| 310 | < 1,0E-05 | 610 | 9,849E-01 | 910 | 9,426E-01 | 1250 | 9,381E-01 | 2750 | 3,480E-01 | 4250 | 7,064E-02 |
| 320 | < 1,000E-05 | 620 | 9,840E-01 | 920 | 9,417E-01 | 1300 | 9,402E-01 | 2800 | 2,470E-01 | 4300 | 5,106E-02 |
| 330 | < 1,000E-05 | 630 | 9,831E-01 | 930 | 9,409E-01 | 1350 | 9,434E-01 | 2850 | 2,521E-01 | 4350 | 3,463E-02 |
| 340 | < 1,000E-05 | 640 | 9,821E-01 | 940 | 9,402E-01 | 1400 | 9,440E-01 | 2900 | 2,632E-01 | 4400 | 2,040E-02 |
| 350 | < 1,000E-05 | 650 | 9,811E-01 | 950 | 9,396E-01 | 1450 | 9,502E-01 | 2950 | 2,713E-01 | 4450 | 9,120E-03 |
| 360 | < 1,000E-05 | 660 | 9,798E-01 | 960 | 9,391E-01 | 1500 | 9,556E-01 | 3000 | 2,723E-01 | 4500 | 3,420E-03 |
| 370 | < 1,000E-05 | 670 | 9,786E-01 | 970 | 9,386E-01 | 1550 | 9,595E-01 | 3050 | 2,640E-01 | 4550 | 1,100E-03 |
| 380 | < 1,000E-05 | 680 | 9,772E-01 | 980 | 9,382E-01 | 1600 | 9,627E-01 | 3100 | 2,507E-01 | 4600 | 3,097E-04 |
| 390 | < 1,000E-05 | 690 | 9,759E-01 | 990 | 9,377E-01 | 1650 | 9,646E-01 | 3150 | 2,344E-01 | 4650 | 9,484E-05 |
| 400 | < 1,000E-05 | 700 | 9,745E-01 | 1000 | 9,372E-01 | 1700 | 9,650E-01 | 3200 | 2,168E-01 | 4700 | 3,236E-05 |
| 410 | < 1,000E-05 | 710 | 9,730E-01 | 1010 | 9,368E-01 | 1750 | 9,640E-01 | 3250 | 1,998E-01 | 4750 | 1,500E-05 |
| 420 | < 1,000E-05 | 720 | 9,714E-01 | 1020 | 9,365E-01 | 1800 | 9,625E-01 | 3300 | 1,836E-01 | 4800 | < 1,000E-05 |
| 430 | < 1,000E-05 | 730 | 9,698E-01 | 1030 | 9,363E-01 | 1850 | 9,605E-01 | 3350 | 1,681E-01 | 4850 | < 1,000E-05 |
| 440 | 9,602E-03 | 740 | 9,680E-01 | 1040 | 9,361E-01 | 1900 | 9,583E-01 | 3400 | 1,540E-01 | 4900 | < 1,000E-05 |
| 450 | 2,603E-01 | 750 | 9,662E-01 | 1050 | 9,359E-01 | 1950 | 9,563E-01 | 3450 | 1,421E-01 | 4950 | < 1,000E-05 |
| 460 | 6,726E-01 | 760 | 9,643E-01 | 1060 | 9,357E-01 | 2000 | 9,543E-01 | 3500 | 1,357E-01 | 5000 | < 1,000E-05 |
| 470 | 8,568E-01 | 770 | 9,623E-01 | 1070 | 9,356E-01 | 2050 | 9,519E-01 | 3550 | 1,359E-01 | 5050 | < 1,000E-05 |
| 480 | 9,199E-01 | 780 | 9,604E-01 | 1080 | 9,355E-01 | 2100 | 9,484E-01 | 3600 | 1,378E-01 | 5100 | < 1,000E-05 |
| 490 | 9,464E-01 | 790 | 9,585E-01 | 1090 | 9,354E-01 | 2150 | 9,434E-01 | 3650 | 1,333E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## GG475

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 475 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 410 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,92) | = 550 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

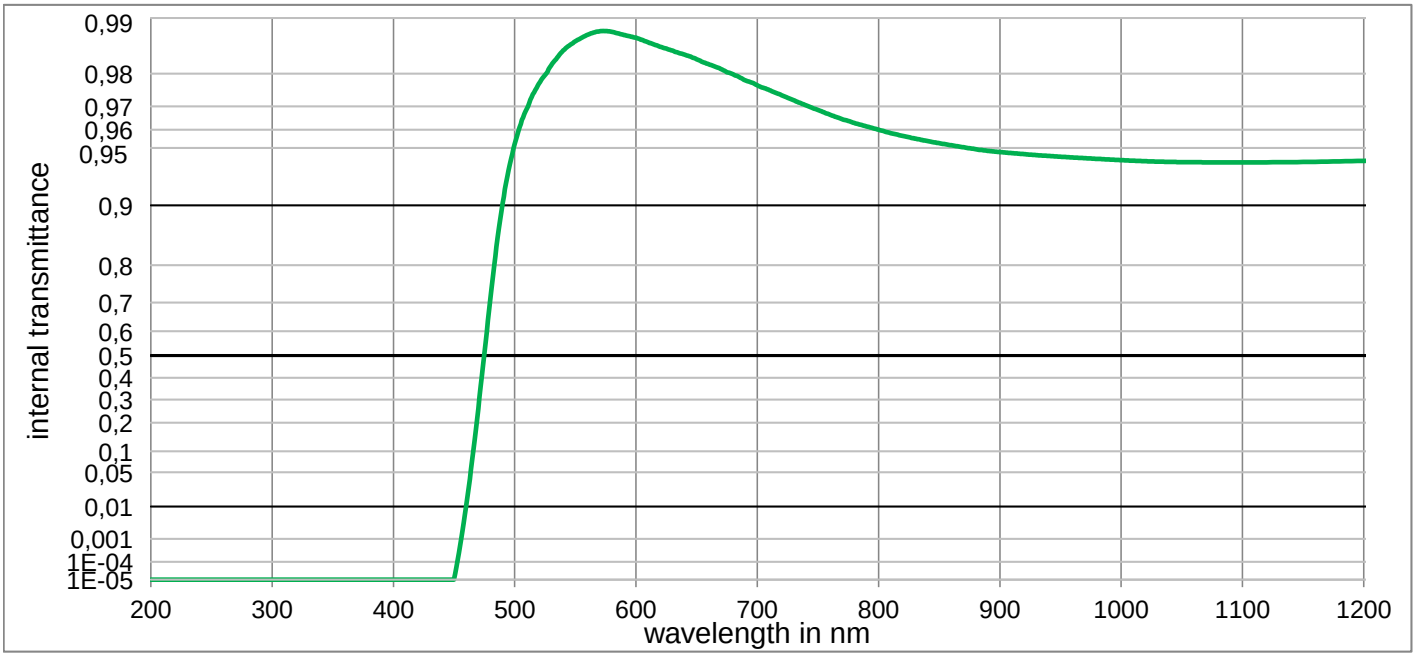
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = 3,00 mm | |
| **Density** | | |
| ρ | = 2,56 g/cm³ | |
| **Knoop hardness** | | |
| $HK_{[0.1/20]}$ | = 451 | |

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

| Chemical properties |
|---|
| **Chemical resistance** |
| FR class = 0 |
| SR class = 1 |
| AR class = 1 |
| **Resistance against humidity** |
| Resistant glass |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 |

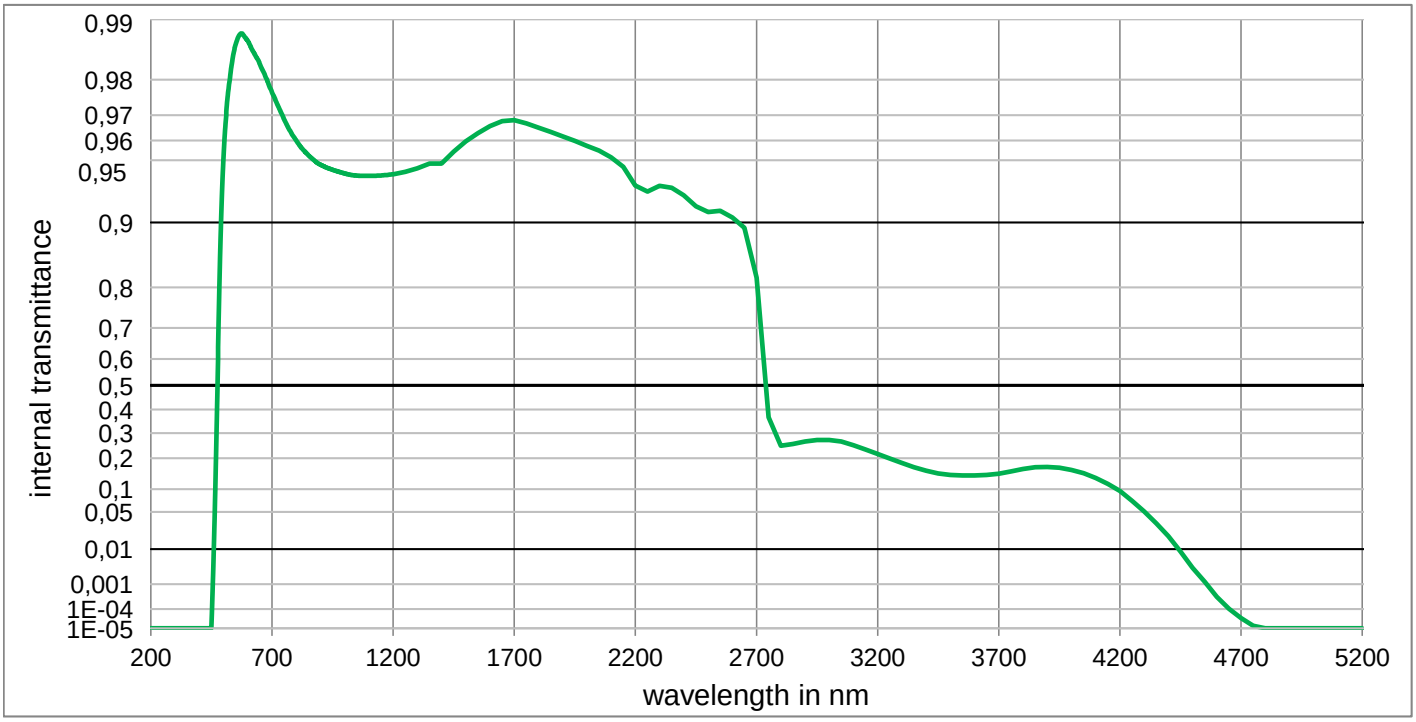
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,381 | 0,394 | 0,401 |
| | y | 0,463 | 0,485 | 0,494 |
| | Y | 89,5 | 88,5 | 87,7 |
| | $\lambda_d$ | 568 nm | 569 nm | 569 nm |
| | $P_e$ | 0,567 | 0,664 | 0,709 |
| Illuminant A | x | 0,483 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## GG475




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,523E-01 | 800 | 9,600E-01 | 1100 | 9,404E-01 | 2200 | 9,336E-01 | 3700 | 1,458E-01 |
| 210 | < 1,0E-05 | 510 | 9,691E-01 | 810 | 9,583E-01 | 1110 | 9,404E-01 | 2250 | 9,290E-01 | 3750 | 1,530E-01 |
| 220 | < 1,0E-05 | 520 | 9,773E-01 | 820 | 9,568E-01 | 1120 | 9,404E-01 | 2300 | 9,335E-01 | 3800 | 1,617E-01 |
| 230 | < 1,0E-05 | 530 | 9,819E-01 | 830 | 9,554E-01 | 1130 | 9,405E-01 | 2350 | 9,320E-01 | 3850 | 1,674E-01 |
| 240 | < 1,0E-05 | 540 | 9,850E-01 | 840 | 9,541E-01 | 1140 | 9,406E-01 | 2400 | 9,259E-01 | 3900 | 1,685E-01 |
| 250 | < 1,0E-05 | 550 | 9,866E-01 | 850 | 9,529E-01 | 1150 | 9,407E-01 | 2450 | 9,164E-01 | 3950 | 1,656E-01 |
| 260 | < 1,0E-05 | 560 | 9,877E-01 | 860 | 9,516E-01 | 1160 | 9,408E-01 | 2500 | 9,109E-01 | 4000 | 1,582E-01 |
| 270 | < 1,0E-05 | 570 | 9,882E-01 | 870 | 9,504E-01 | 1170 | 9,409E-01 | 2550 | 9,120E-01 | 4050 | 1,473E-01 |
| 280 | < 1,0E-05 | 580 | 9,881E-01 | 880 | 9,492E-01 | 1180 | 9,411E-01 | 2600 | 9,054E-01 | 4100 | 1,326E-01 |
| 290 | < 1,0E-05 | 590 | 9,876E-01 | 890 | 9,482E-01 | 1190 | 9,413E-01 | 2650 | 8,939E-01 | 4150 | 1,147E-01 |
| 300 | < 1,0E-05 | 600 | 9,872E-01 | 900 | 9,474E-01 | 1200 | 9,415E-01 | 2700 | 8,190E-01 | 4200 | 9,520E-02 |
| 310 | < 1,0E-05 | 610 | 9,864E-01 | 910 | 9,468E-01 | 1250 | 9,430E-01 | 2750 | 3,672E-01 | 4250 | 7,140E-02 |
| 320 | < 1,000E-05 | 620 | 9,857E-01 | 920 | 9,461E-01 | 1300 | 9,453E-01 | 2800 | 2,487E-01 | 4300 | 5,080E-02 |
| 330 | < 1,000E-05 | 630 | 9,850E-01 | 930 | 9,454E-01 | 1350 | 9,481E-01 | 2850 | 2,550E-01 | 4350 | 3,277E-02 |
| 340 | < 1,000E-05 | 640 | 9,842E-01 | 940 | 9,449E-01 | 1400 | 9,481E-01 | 2900 | 2,658E-01 | 4400 | 1,894E-02 |
| 350 | < 1,000E-05 | 650 | 9,833E-01 | 950 | 9,443E-01 | 1450 | 9,546E-01 | 2950 | 2,713E-01 | 4450 | 8,760E-03 |
| 360 | < 1,000E-05 | 660 | 9,822E-01 | 960 | 9,438E-01 | 1500 | 9,596E-01 | 3000 | 2,719E-01 | 4500 | 3,295E-03 |
| 370 | < 1,000E-05 | 670 | 9,811E-01 | 970 | 9,434E-01 | 1550 | 9,633E-01 | 3050 | 2,657E-01 | 4550 | 1,200E-03 |
| 380 | < 1,000E-05 | 680 | 9,799E-01 | 980 | 9,429E-01 | 1600 | 9,660E-01 | 3100 | 2,506E-01 | 4600 | 3,357E-04 |
| 390 | < 1,000E-05 | 690 | 9,783E-01 | 990 | 9,424E-01 | 1650 | 9,679E-01 | 3150 | 2,333E-01 | 4650 | 1,035E-04 |
| 400 | < 1,000E-05 | 700 | 9,769E-01 | 1000 | 9,420E-01 | 1700 | 9,683E-01 | 3200 | 2,158E-01 | 4700 | 3,656E-05 |
| 410 | < 1,000E-05 | 710 | 9,754E-01 | 1010 | 9,416E-01 | 1750 | 9,671E-01 | 3250 | 1,989E-01 | 4750 | 1,393E-05 |
| 420 | < 1,000E-05 | 720 | 9,739E-01 | 1020 | 9,412E-01 | 1800 | 9,655E-01 | 3300 | 1,827E-01 | 4800 | < 1,000E-05 |
| 430 | < 1,000E-05 | 730 | 9,722E-01 | 1030 | 9,409E-01 | 1850 | 9,638E-01 | 3350 | 1,680E-01 | 4850 | < 1,000E-05 |
| 440 | < 1,000E-05 | 740 | 9,704E-01 | 1040 | 9,407E-01 | 1900 | 9,618E-01 | 3400 | 1,558E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,686E-01 | 1050 | 9,406E-01 | 1950 | 9,598E-01 | 3450 | 1,467E-01 | 4950 | < 1,000E-05 |
| 460 | 1,043E-02 | 760 | 9,667E-01 | 1060 | 9,405E-01 | 2000 | 9,575E-01 | 3500 | 1,419E-01 | 5000 | < 1,000E-05 |
| 470 | 2,606E-01 | 770 | 9,649E-01 | 1070 | 9,404E-01 | 2050 | 9,551E-01 | 3550 | 1,402E-01 | 5050 | < 1,000E-05 |
| 480 | 7,129E-01 | 780 | 9,632E-01 | 1080 | 9,404E-01 | 2100 | 9,516E-01 | 3600 | 1,403E-01 | 5100 | < 1,000E-05 |
| 490 | 9,022E-01 | 790 | 9,616E-01 | 1090 | 9,404E-01 | 2150 | 9,462E-01 | 3650 | 1,418E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## GG495

| Optical properties | | |
|---|---|---|
| **Reflection factor** | | |
| $P_d$ | = | 0,917 |
| **Spectral values guaranteed (d = 3 mm)** | | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = | 495 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = | 430 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,92) | = | 560 nm |
| **Refractive indices** | | |
| $n_d$ ( 587,6 nm) | = | 1,52 |
| $n_s$ ( 852 nm) | = | 1,52 |
| $n_t$ (1014 nm) | = | 1,51 |
| **Sellmeier coefficients** | | |
| valid from 400 nm to 2400 nm | | |
| $B_1$ | = | 1,2863 |
| $B_2$ | = | 0,0012 |
| $B_3$ | = | 0,8815 |
| $C_1$ | = | 9,397E-03 µm² |
| $C_2$ | = | 1,5104E-01 µm² |
| $C_3$ | = | 106,389 µm² |
| **Internal quality** | | |
| Bubble class | | 3 |

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

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 0 |
| SR class | = | 1 |
| AR class | = | 1 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

**Colormetric properties**

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

**Notes**

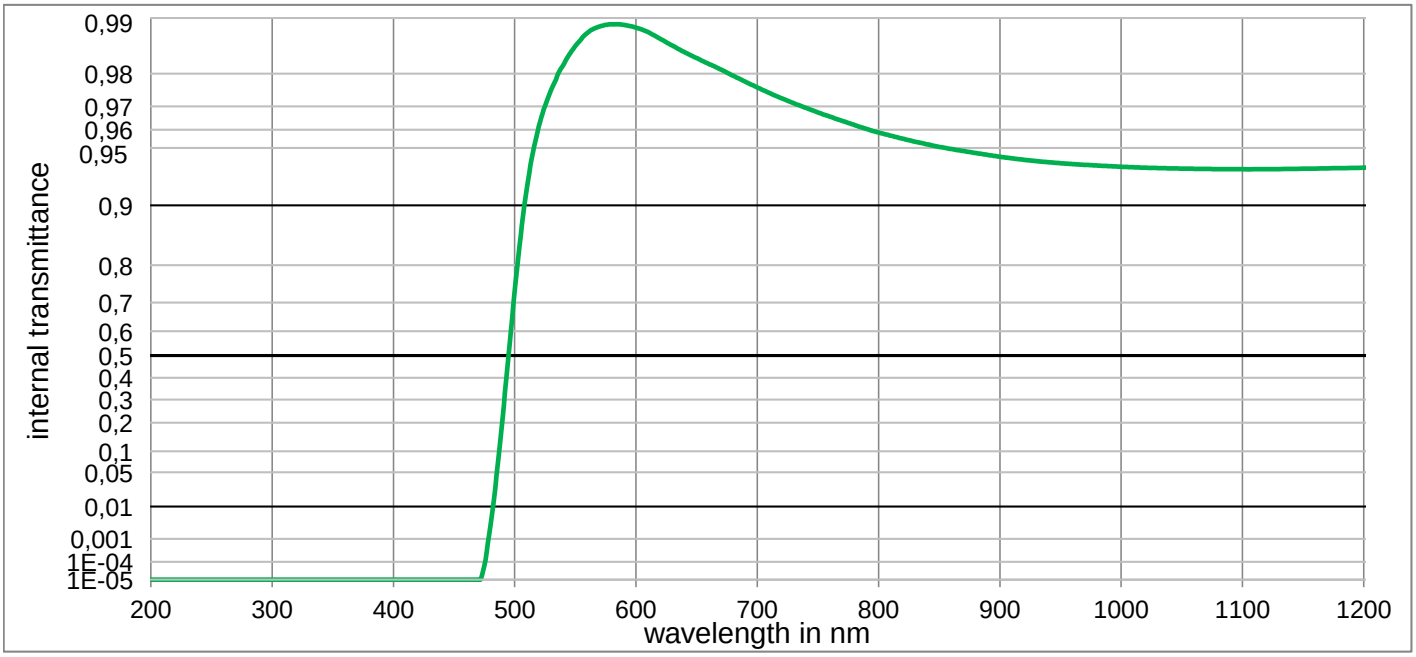
Stricking glass

Longpass filter

DIN 58131

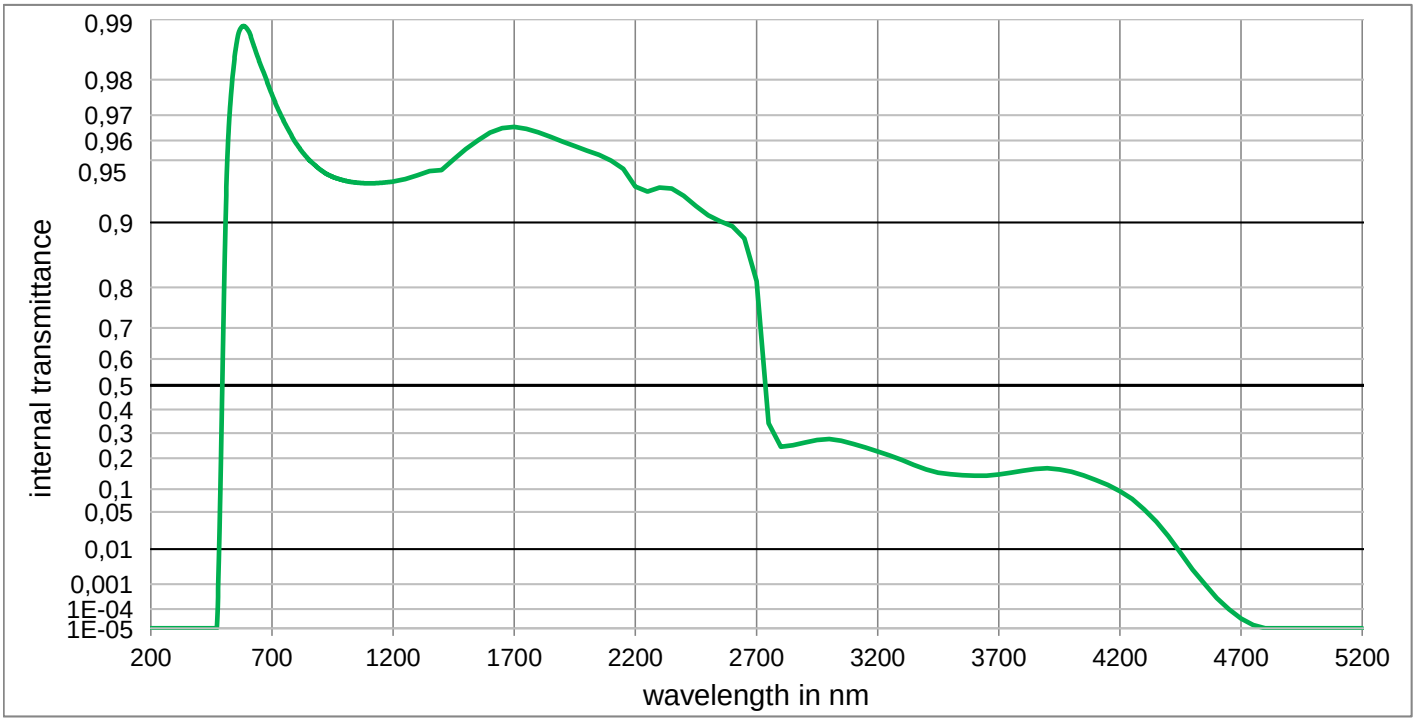
**Disclaimer**

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



# Data Sheet

## GG495




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 7,321E-01 | 800 | 9,586E-01 | 1100 | 9,352E-01 | 2200 | 9,329E-01 | 3700 | 1,435E-01 |
| 210 | < 1,0E-05 | 510 | 9,185E-01 | 810 | 9,569E-01 | 1110 | 9,352E-01 | 2250 | 9,289E-01 | 3750 | 1,488E-01 |
| 220 | < 1,0E-05 | 520 | 9,617E-01 | 820 | 9,553E-01 | 1120 | 9,352E-01 | 2300 | 9,320E-01 | 3800 | 1,553E-01 |
| 230 | < 1,0E-05 | 530 | 9,755E-01 | 830 | 9,537E-01 | 1130 | 9,353E-01 | 2350 | 9,313E-01 | 3850 | 1,619E-01 |
| 240 | < 1,0E-05 | 540 | 9,821E-01 | 840 | 9,522E-01 | 1140 | 9,355E-01 | 2400 | 9,256E-01 | 3900 | 1,643E-01 |
| 250 | < 1,0E-05 | 550 | 9,858E-01 | 850 | 9,507E-01 | 1150 | 9,356E-01 | 2450 | 9,166E-01 | 3950 | 1,600E-01 |
| 260 | < 1,0E-05 | 560 | 9,880E-01 | 860 | 9,493E-01 | 1160 | 9,357E-01 | 2500 | 9,077E-01 | 4000 | 1,521E-01 |
| 270 | < 1,0E-05 | 570 | 9,889E-01 | 870 | 9,481E-01 | 1170 | 9,359E-01 | 2550 | 9,014E-01 | 4050 | 1,405E-01 |
| 280 | < 1,0E-05 | 580 | 9,892E-01 | 880 | 9,468E-01 | 1180 | 9,360E-01 | 2600 | 8,958E-01 | 4100 | 1,265E-01 |
| 290 | < 1,0E-05 | 590 | 9,891E-01 | 890 | 9,456E-01 | 1190 | 9,362E-01 | 2650 | 8,808E-01 | 4150 | 1,113E-01 |
| 300 | < 1,0E-05 | 600 | 9,887E-01 | 900 | 9,443E-01 | 1200 | 9,364E-01 | 2700 | 8,125E-01 | 4200 | 9,490E-02 |
| 310 | < 1,0E-05 | 610 | 9,881E-01 | 910 | 9,432E-01 | 1250 | 9,382E-01 | 2750 | 3,410E-01 | 4250 | 7,570E-02 |
| 320 | < 1,000E-05 | 620 | 9,870E-01 | 920 | 9,422E-01 | 1300 | 9,407E-01 | 2800 | 2,445E-01 | 4300 | 5,470E-02 |
| 330 | < 1,000E-05 | 630 | 9,859E-01 | 930 | 9,413E-01 | 1350 | 9,435E-01 | 2850 | 2,499E-01 | 4350 | 3,490E-02 |
| 340 | < 1,000E-05 | 640 | 9,847E-01 | 940 | 9,405E-01 | 1400 | 9,441E-01 | 2900 | 2,611E-01 | 4400 | 1,910E-02 |
| 350 | < 1,000E-05 | 650 | 9,835E-01 | 950 | 9,398E-01 | 1450 | 9,506E-01 | 2950 | 2,714E-01 | 4450 | 8,150E-03 |
| 360 | < 1,000E-05 | 660 | 9,823E-01 | 960 | 9,391E-01 | 1500 | 9,560E-01 | 3000 | 2,751E-01 | 4500 | 2,939E-03 |
| 370 | < 1,000E-05 | 670 | 9,810E-01 | 970 | 9,386E-01 | 1550 | 9,601E-01 | 3050 | 2,686E-01 | 4550 | 1,008E-03 |
| 380 | < 1,000E-05 | 680 | 9,795E-01 | 980 | 9,381E-01 | 1600 | 9,634E-01 | 3100 | 2,558E-01 | 4600 | 3,020E-04 |
| 390 | < 1,000E-05 | 690 | 9,779E-01 | 990 | 9,376E-01 | 1650 | 9,653E-01 | 3150 | 2,409E-01 | 4650 | 9,616E-05 |
| 400 | < 1,000E-05 | 700 | 9,763E-01 | 1000 | 9,371E-01 | 1700 | 9,657E-01 | 3200 | 2,257E-01 | 4700 | 3,420E-05 |
| 410 | < 1,000E-05 | 710 | 9,746E-01 | 1010 | 9,367E-01 | 1750 | 9,650E-01 | 3250 | 2,105E-01 | 4750 | 1,528E-05 |
| 420 | < 1,000E-05 | 720 | 9,729E-01 | 1020 | 9,364E-01 | 1800 | 9,636E-01 | 3300 | 1,931E-01 | 4800 | < 1,000E-05 |
| 430 | < 1,000E-05 | 730 | 9,712E-01 | 1030 | 9,361E-01 | 1850 | 9,616E-01 | 3350 | 1,754E-01 | 4850 | < 1,000E-05 |
| 440 | < 1,000E-05 | 740 | 9,695E-01 | 1040 | 9,359E-01 | 1900 | 9,595E-01 | 3400 | 1,601E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,677E-01 | 1050 | 9,357E-01 | 1950 | 9,574E-01 | 3450 | 1,487E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,659E-01 | 1060 | 9,356E-01 | 2000 | 9,552E-01 | 3500 | 1,438E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,641E-01 | 1070 | 9,354E-01 | 2050 | 9,530E-01 | 3550 | 1,410E-01 | 5050 | < 1,000E-05 |
| 480 | 2,765E-03 | 780 | 9,623E-01 | 1080 | 9,353E-01 | 2100 | 9,498E-01 | 3600 | 1,393E-01 | 5100 | < 1,000E-05 |
| 490 | 2,183E-01 | 790 | 9,604E-01 | 1090 | 9,352E-01 | 2150 | 9,449E-01 | 3650 | 1,396E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## OG515

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,921 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 515 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 440 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 580 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,51 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,50 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

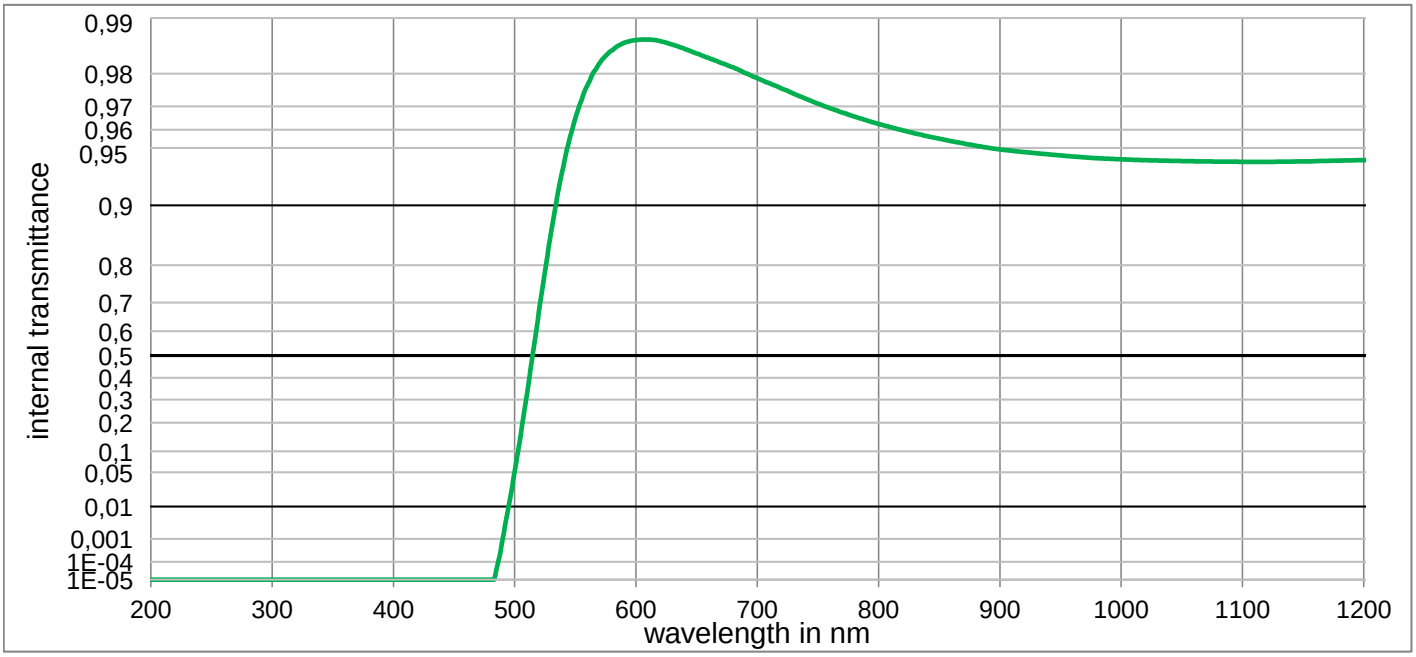
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,56 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 455 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

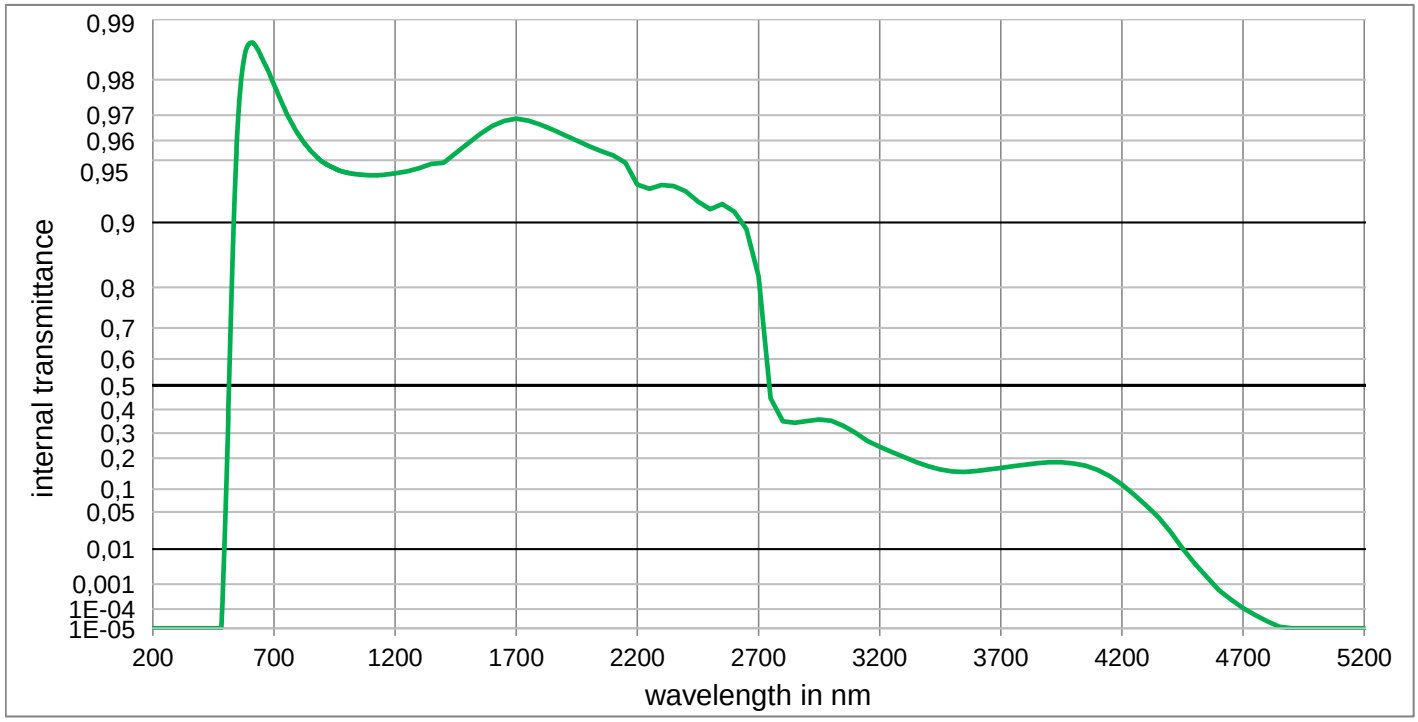
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,448 | 0,465 | 0,473 |
| | y | 0,516 | 0,519 | 0,515 |
| | Y | 81,5 | 77,9 | 75,4 |
| | $\lambda_d$ | 573 nm | 574 nm | 575 nm |
| | $P_e$ | 0,902 | 0,958 | 0,969 |
| Illuminant A | x | 0,516 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## OG515




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 5,093E-02 | 800 | 9,627E-01 | 1100 | 9,408E-01 | 2200 | 9,342E-01 | 3700 | 1,653E-01 |
| 210 | < 1,0E-05 | 510 | 3,219E-01 | 810 | 9,612E-01 | 1110 | 9,408E-01 | 2250 | 9,311E-01 | 3750 | 1,708E-01 |
| 220 | < 1,0E-05 | 520 | 6,692E-01 | 820 | 9,597E-01 | 1120 | 9,408E-01 | 2300 | 9,339E-01 | 3800 | 1,767E-01 |
| 230 | < 1,0E-05 | 530 | 8,627E-01 | 830 | 9,582E-01 | 1130 | 9,408E-01 | 2350 | 9,332E-01 | 3850 | 1,817E-01 |
| 240 | < 1,0E-05 | 540 | 9,370E-01 | 840 | 9,568E-01 | 1140 | 9,409E-01 | 2400 | 9,292E-01 | 3900 | 1,850E-01 |
| 250 | < 1,0E-05 | 550 | 9,652E-01 | 850 | 9,553E-01 | 1150 | 9,411E-01 | 2450 | 9,207E-01 | 3950 | 1,850E-01 |
| 260 | < 1,0E-05 | 560 | 9,769E-01 | 860 | 9,540E-01 | 1160 | 9,413E-01 | 2500 | 9,136E-01 | 4000 | 1,811E-01 |
| 270 | < 1,0E-05 | 570 | 9,824E-01 | 870 | 9,527E-01 | 1170 | 9,414E-01 | 2550 | 9,185E-01 | 4050 | 1,729E-01 |
| 280 | < 1,0E-05 | 580 | 9,850E-01 | 880 | 9,514E-01 | 1180 | 9,416E-01 | 2600 | 9,111E-01 | 4100 | 1,582E-01 |
| 290 | < 1,0E-05 | 590 | 9,864E-01 | 890 | 9,501E-01 | 1190 | 9,418E-01 | 2650 | 8,926E-01 | 4150 | 1,380E-01 |
| 300 | < 1,0E-05 | 600 | 9,868E-01 | 900 | 9,491E-01 | 1200 | 9,421E-01 | 2700 | 8,215E-01 | 4200 | 1,127E-01 |
| 310 | < 1,0E-05 | 610 | 9,869E-01 | 910 | 9,482E-01 | 1250 | 9,434E-01 | 2750 | 4,471E-01 | 4250 | 8,609E-02 |
| 320 | < 1,000E-05 | 620 | 9,867E-01 | 920 | 9,474E-01 | 1300 | 9,454E-01 | 2800 | 3,500E-01 | 4300 | 6,209E-02 |
| 330 | < 1,000E-05 | 630 | 9,861E-01 | 930 | 9,467E-01 | 1350 | 9,479E-01 | 2850 | 3,433E-01 | 4350 | 4,140E-02 |
| 340 | < 1,000E-05 | 640 | 9,853E-01 | 940 | 9,459E-01 | 1400 | 9,486E-01 | 2900 | 3,513E-01 | 4400 | 2,314E-02 |
| 350 | < 1,000E-05 | 650 | 9,844E-01 | 950 | 9,452E-01 | 1450 | 9,538E-01 | 2950 | 3,569E-01 | 4450 | 1,039E-02 |
| 360 | < 1,000E-05 | 660 | 9,835E-01 | 960 | 9,445E-01 | 1500 | 9,586E-01 | 3000 | 3,519E-01 | 4500 | 4,394E-03 |
| 370 | < 1,000E-05 | 670 | 9,825E-01 | 970 | 9,439E-01 | 1550 | 9,628E-01 | 3050 | 3,310E-01 | 4550 | 1,743E-03 |
| 380 | < 1,000E-05 | 680 | 9,815E-01 | 980 | 9,433E-01 | 1600 | 9,660E-01 | 3100 | 3,011E-01 | 4600 | 6,152E-04 |
| 390 | < 1,000E-05 | 690 | 9,802E-01 | 990 | 9,429E-01 | 1650 | 9,680E-01 | 3150 | 2,673E-01 | 4650 | 2,588E-04 |
| 400 | < 1,000E-05 | 700 | 9,789E-01 | 1000 | 9,426E-01 | 1700 | 9,688E-01 | 3200 | 2,440E-01 | 4700 | 1,117E-04 |
| 410 | < 1,000E-05 | 710 | 9,774E-01 | 1010 | 9,422E-01 | 1750 | 9,681E-01 | 3250 | 2,238E-01 | 4750 | 5,117E-05 |
| 420 | < 1,000E-05 | 720 | 9,760E-01 | 1020 | 9,419E-01 | 1800 | 9,666E-01 | 3300 | 2,048E-01 | 4800 | 2,449E-05 |
| 430 | < 1,000E-05 | 730 | 9,744E-01 | 1030 | 9,417E-01 | 1850 | 9,647E-01 | 3350 | 1,862E-01 | 4850 | 1,211E-05 |
| 440 | < 1,000E-05 | 740 | 9,727E-01 | 1040 | 9,415E-01 | 1900 | 9,624E-01 | 3400 | 1,707E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,710E-01 | 1050 | 9,413E-01 | 1950 | 9,599E-01 | 3450 | 1,598E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,693E-01 | 1060 | 9,412E-01 | 2000 | 9,574E-01 | 3500 | 1,533E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,676E-01 | 1070 | 9,410E-01 | 2050 | 9,549E-01 | 3550 | 1,517E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,660E-01 | 1080 | 9,409E-01 | 2100 | 9,526E-01 | 3600 | 1,549E-01 | 5100 | < 1,000E-05 |
| 490 | 9,674E-04 | 790 | 9,644E-01 | 1090 | 9,408E-01 | 2150 | 9,486E-01 | 3650 | 1,601E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## OG530

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,921 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 530 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 460 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 600 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,51 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,50 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

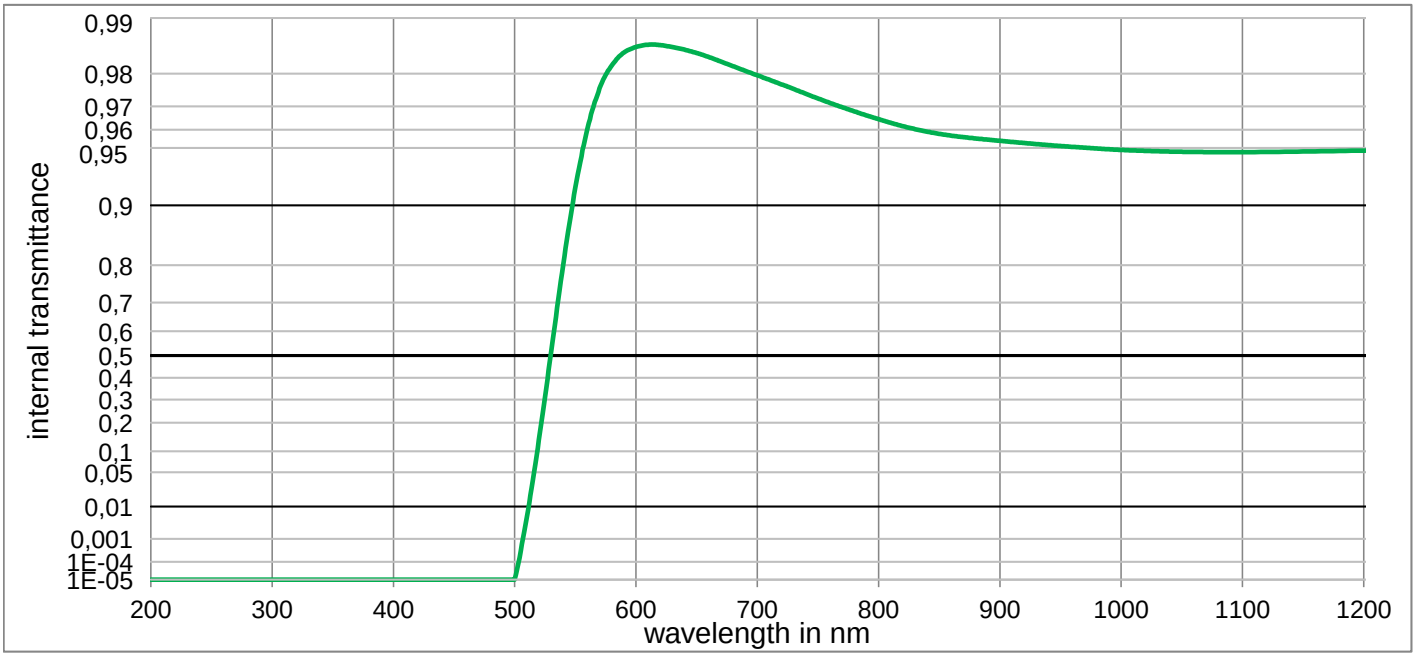
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,56 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 450 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

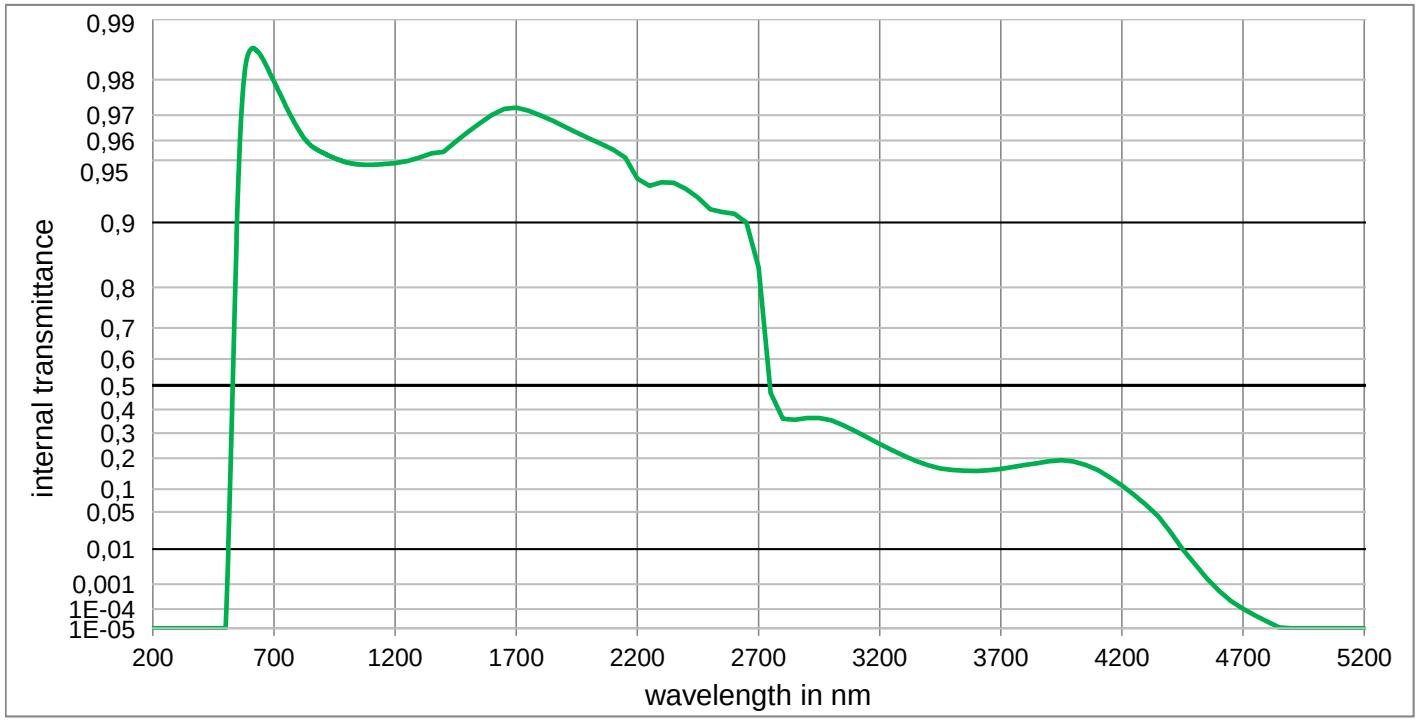
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,476 | 0,496 | 0,505 |
| | y | 0,501 | 0,498 | 0,490 |
| | Y | 73,6 | 68,7 | 65,6 |
| | $\lambda_d$ | 576 nm | 578 nm | 579 nm |
| | $P_e$ | 0,938 | 0,985 | 0,990 |
| Illuminant A | x | 0,534 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## OG530




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,649E-01 | 1100 | 9,474E-01 | 2200 | 9,385E-01 | 3700 | 1,617E-01 |
| 210 | < 1,0E-05 | 510 | 5,189E-03 | 810 | 9,633E-01 | 1110 | 9,474E-01 | 2250 | 9,335E-01 | 3750 | 1,681E-01 |
| 220 | < 1,0E-05 | 520 | 1,364E-01 | 820 | 9,617E-01 | 1120 | 9,475E-01 | 2300 | 9,360E-01 | 3800 | 1,751E-01 |
| 230 | < 1,0E-05 | 530 | 5,140E-01 | 830 | 9,603E-01 | 1130 | 9,476E-01 | 2350 | 9,356E-01 | 3850 | 1,819E-01 |
| 240 | < 1,0E-05 | 540 | 8,018E-01 | 840 | 9,591E-01 | 1140 | 9,477E-01 | 2400 | 9,311E-01 | 3900 | 1,888E-01 |
| 250 | < 1,0E-05 | 550 | 9,191E-01 | 850 | 9,579E-01 | 1150 | 9,478E-01 | 2450 | 9,242E-01 | 3950 | 1,925E-01 |
| 260 | < 1,0E-05 | 560 | 9,608E-01 | 860 | 9,570E-01 | 1160 | 9,479E-01 | 2500 | 9,136E-01 | 4000 | 1,884E-01 |
| 270 | < 1,0E-05 | 570 | 9,760E-01 | 870 | 9,562E-01 | 1170 | 9,480E-01 | 2550 | 9,108E-01 | 4050 | 1,758E-01 |
| 280 | < 1,0E-05 | 580 | 9,819E-01 | 880 | 9,555E-01 | 1180 | 9,481E-01 | 2600 | 9,091E-01 | 4100 | 1,579E-01 |
| 290 | < 1,0E-05 | 590 | 9,846E-01 | 890 | 9,548E-01 | 1190 | 9,482E-01 | 2650 | 8,999E-01 | 4150 | 1,342E-01 |
| 300 | < 1,0E-05 | 600 | 9,856E-01 | 900 | 9,542E-01 | 1200 | 9,484E-01 | 2700 | 8,375E-01 | 4200 | 1,099E-01 |
| 310 | < 1,0E-05 | 610 | 9,861E-01 | 910 | 9,536E-01 | 1250 | 9,496E-01 | 2750 | 4,700E-01 | 4250 | 8,523E-02 |
| 320 | < 1,000E-05 | 620 | 9,860E-01 | 920 | 9,529E-01 | 1300 | 9,515E-01 | 2800 | 3,608E-01 | 4300 | 6,292E-02 |
| 330 | < 1,000E-05 | 630 | 9,856E-01 | 930 | 9,523E-01 | 1350 | 9,537E-01 | 2850 | 3,563E-01 | 4350 | 4,250E-02 |
| 340 | < 1,000E-05 | 640 | 9,852E-01 | 940 | 9,517E-01 | 1400 | 9,545E-01 | 2900 | 3,638E-01 | 4400 | 2,287E-02 |
| 350 | < 1,000E-05 | 650 | 9,845E-01 | 950 | 9,512E-01 | 1450 | 9,595E-01 | 2950 | 3,642E-01 | 4450 | 1,006E-02 |
| 360 | < 1,000E-05 | 660 | 9,837E-01 | 960 | 9,506E-01 | 1500 | 9,637E-01 | 3000 | 3,540E-01 | 4500 | 4,333E-03 |
| 370 | < 1,000E-05 | 670 | 9,828E-01 | 970 | 9,501E-01 | 1550 | 9,672E-01 | 3050 | 3,325E-01 | 4550 | 1,581E-03 |
| 380 | < 1,000E-05 | 680 | 9,818E-01 | 980 | 9,497E-01 | 1600 | 9,701E-01 | 3100 | 3,076E-01 | 4600 | 5,943E-04 |
| 390 | < 1,000E-05 | 690 | 9,807E-01 | 990 | 9,492E-01 | 1650 | 9,721E-01 | 3150 | 2,820E-01 | 4650 | 2,254E-04 |
| 400 | < 1,000E-05 | 700 | 9,796E-01 | 1000 | 9,488E-01 | 1700 | 9,725E-01 | 3200 | 2,556E-01 | 4700 | 1,028E-04 |
| 410 | < 1,000E-05 | 710 | 9,784E-01 | 1010 | 9,484E-01 | 1750 | 9,716E-01 | 3250 | 2,313E-01 | 4750 | 4,932E-05 |
| 420 | < 1,000E-05 | 720 | 9,771E-01 | 1020 | 9,482E-01 | 1800 | 9,700E-01 | 3300 | 2,090E-01 | 4800 | 2,377E-05 |
| 430 | < 1,000E-05 | 730 | 9,758E-01 | 1030 | 9,479E-01 | 1850 | 9,681E-01 | 3350 | 1,900E-01 | 4850 | 1,109E-05 |
| 440 | < 1,000E-05 | 740 | 9,743E-01 | 1040 | 9,477E-01 | 1900 | 9,658E-01 | 3400 | 1,744E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,728E-01 | 1050 | 9,476E-01 | 1950 | 9,634E-01 | 3450 | 1,637E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,713E-01 | 1060 | 9,475E-01 | 2000 | 9,610E-01 | 3500 | 1,583E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,697E-01 | 1070 | 9,474E-01 | 2050 | 9,584E-01 | 3550 | 1,556E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,681E-01 | 1080 | 9,474E-01 | 2100 | 9,556E-01 | 3600 | 1,548E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,665E-01 | 1090 | 9,474E-01 | 2150 | 9,515E-01 | 3650 | 1,570E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## OG550

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,920 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 550 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 480 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 620 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,51 |
| $n_s$ ( 852 nm) | = 1,5 |
| $n_t$ (1014 nm) | = 1,50 |
| **Sellmeier coefficients** | |
| valid from 580 nm to 2330 nm | |
| $B_1$ = | 1,2525 |
| $B_2$ = | 0,0009 |
| $B_3$ = | 0,8269 |
| $C_1$ = | 9,542E-03 µm² |
| $C_2$ = | 1,8891E-01 µm² |
| $C_3$ = | 101,937 µm² |
| **Internal quality** | |
| Bubble class | 3 |

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

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

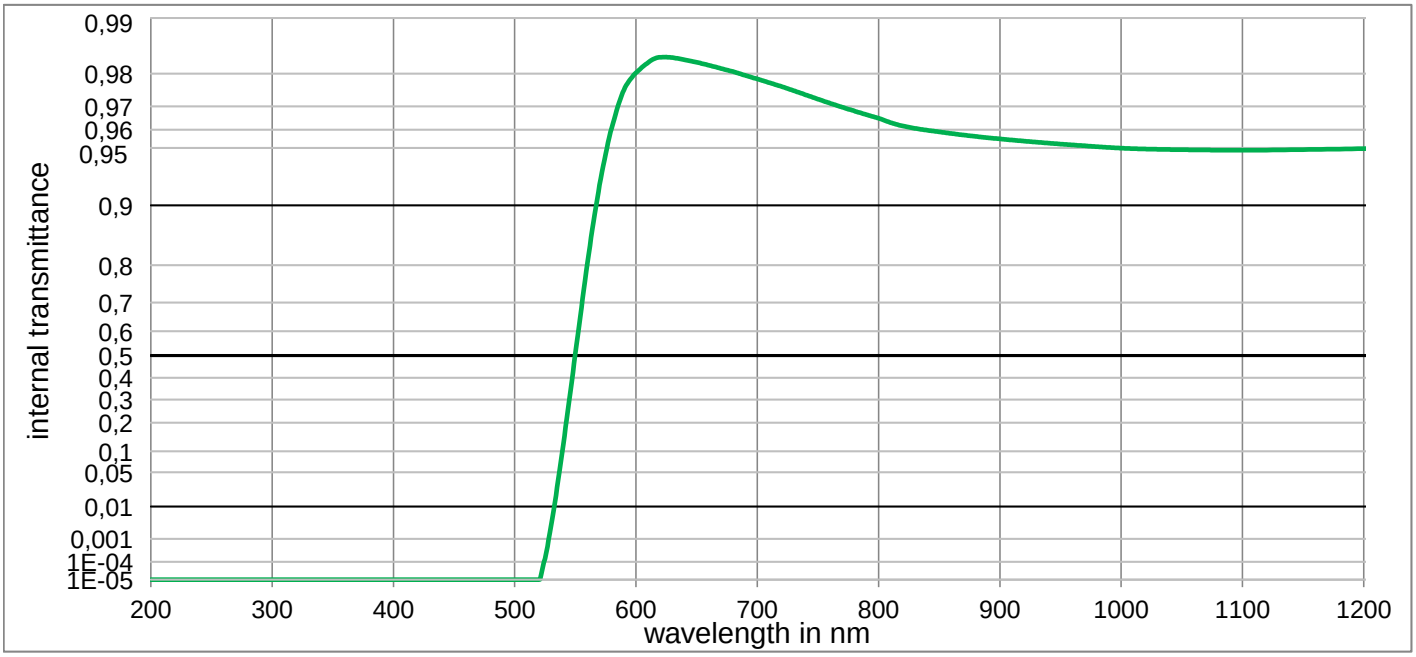
| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

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

| Notes |
|---|
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

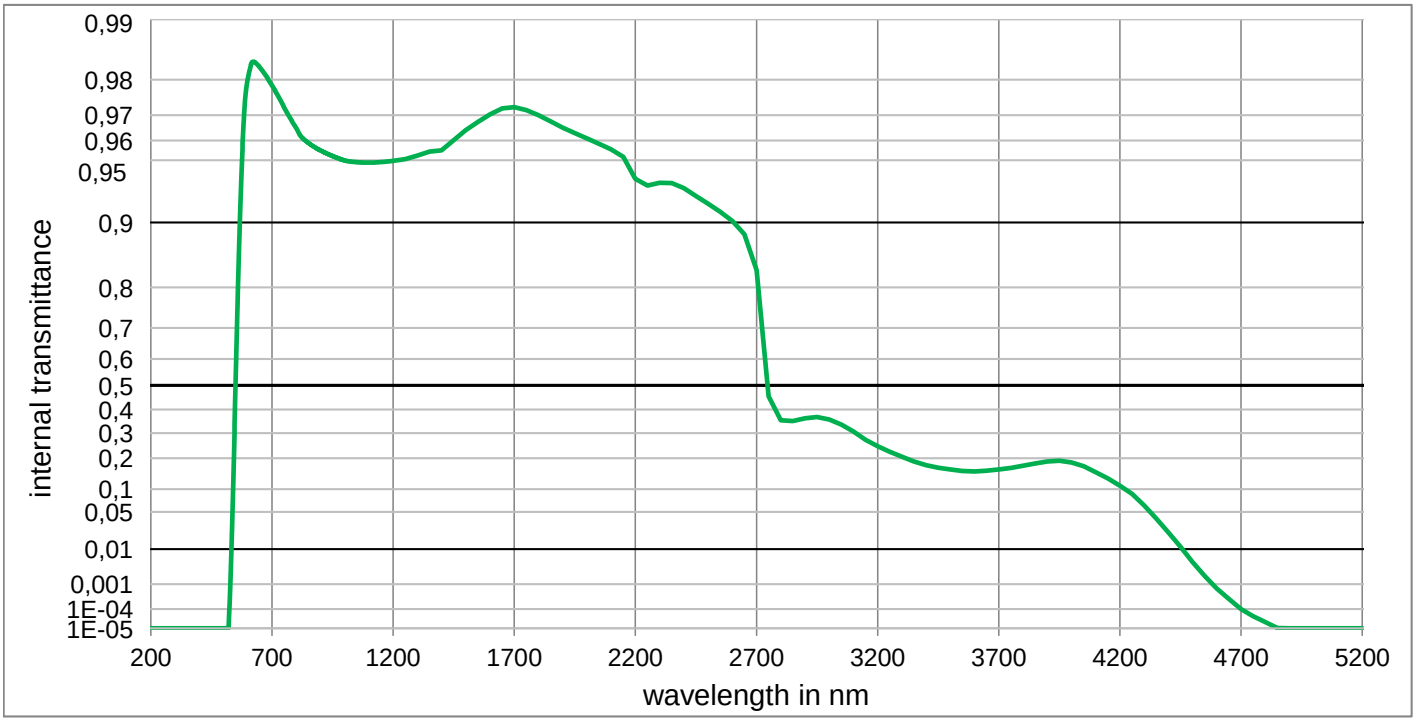
**Disclaimer**

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



# Data Sheet

## OG550




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,652E-01 | 1100 | 9,486E-01 | 2200 | 9,385E-01 | 3700 | 1,601E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,633E-01 | 1110 | 9,486E-01 | 2250 | 9,335E-01 | 3750 | 1,653E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,618E-01 | 1120 | 9,487E-01 | 2300 | 9,356E-01 | 3800 | 1,725E-01 |
| 230 | < 1,0E-05 | 530 | 2,837E-03 | 830 | 9,607E-01 | 1130 | 9,488E-01 | 2350 | 9,353E-01 | 3850 | 1,806E-01 |
| 240 | < 1,0E-05 | 540 | 1,194E-01 | 840 | 9,597E-01 | 1140 | 9,489E-01 | 2400 | 9,316E-01 | 3900 | 1,878E-01 |
| 250 | < 1,0E-05 | 550 | 5,076E-01 | 850 | 9,589E-01 | 1150 | 9,490E-01 | 2450 | 9,254E-01 | 3950 | 1,905E-01 |
| 260 | < 1,0E-05 | 560 | 8,065E-01 | 860 | 9,581E-01 | 1160 | 9,491E-01 | 2500 | 9,186E-01 | 4000 | 1,842E-01 |
| 270 | < 1,0E-05 | 570 | 9,217E-01 | 870 | 9,573E-01 | 1170 | 9,492E-01 | 2550 | 9,112E-01 | 4050 | 1,706E-01 |
| 280 | < 1,0E-05 | 580 | 9,608E-01 | 880 | 9,566E-01 | 1180 | 9,493E-01 | 2600 | 9,015E-01 | 4100 | 1,507E-01 |
| 290 | < 1,0E-05 | 590 | 9,755E-01 | 890 | 9,559E-01 | 1190 | 9,495E-01 | 2650 | 8,864E-01 | 4150 | 1,305E-01 |
| 300 | < 1,0E-05 | 600 | 9,802E-01 | 900 | 9,552E-01 | 1200 | 9,496E-01 | 2700 | 8,330E-01 | 4200 | 1,098E-01 |
| 310 | < 1,0E-05 | 610 | 9,826E-01 | 910 | 9,546E-01 | 1250 | 9,507E-01 | 2750 | 4,559E-01 | 4250 | 8,790E-02 |
| 320 | < 1,000E-05 | 620 | 9,837E-01 | 920 | 9,540E-01 | 1300 | 9,525E-01 | 2800 | 3,545E-01 | 4300 | 6,225E-02 |
| 330 | < 1,000E-05 | 630 | 9,836E-01 | 930 | 9,534E-01 | 1350 | 9,547E-01 | 2850 | 3,508E-01 | 4350 | 3,942E-02 |
| 340 | < 1,000E-05 | 640 | 9,832E-01 | 940 | 9,529E-01 | 1400 | 9,553E-01 | 2900 | 3,630E-01 | 4400 | 2,259E-02 |
| 350 | < 1,000E-05 | 650 | 9,826E-01 | 950 | 9,523E-01 | 1450 | 9,602E-01 | 2950 | 3,684E-01 | 4450 | 1,125E-02 |
| 360 | < 1,000E-05 | 660 | 9,820E-01 | 960 | 9,518E-01 | 1500 | 9,644E-01 | 3000 | 3,570E-01 | 4500 | 4,721E-03 |
| 370 | < 1,000E-05 | 670 | 9,813E-01 | 970 | 9,513E-01 | 1550 | 9,676E-01 | 3050 | 3,358E-01 | 4550 | 1,845E-03 |
| 380 | < 1,000E-05 | 680 | 9,805E-01 | 980 | 9,508E-01 | 1600 | 9,703E-01 | 3100 | 3,065E-01 | 4600 | 7,031E-04 |
| 390 | < 1,000E-05 | 690 | 9,796E-01 | 990 | 9,503E-01 | 1650 | 9,722E-01 | 3150 | 2,725E-01 | 4650 | 2,704E-04 |
| 400 | < 1,000E-05 | 700 | 9,786E-01 | 1000 | 9,499E-01 | 1700 | 9,727E-01 | 3200 | 2,459E-01 | 4700 | 9,979E-05 |
| 410 | < 1,000E-05 | 710 | 9,776E-01 | 1010 | 9,496E-01 | 1750 | 9,717E-01 | 3250 | 2,244E-01 | 4750 | 4,519E-05 |
| 420 | < 1,000E-05 | 720 | 9,765E-01 | 1020 | 9,493E-01 | 1800 | 9,700E-01 | 3300 | 2,055E-01 | 4800 | 2,259E-05 |
| 430 | < 1,000E-05 | 730 | 9,753E-01 | 1030 | 9,492E-01 | 1850 | 9,678E-01 | 3350 | 1,881E-01 | 4850 | 1,052E-05 |
| 440 | < 1,000E-05 | 740 | 9,740E-01 | 1040 | 9,490E-01 | 1900 | 9,655E-01 | 3400 | 1,749E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,726E-01 | 1050 | 9,489E-01 | 1950 | 9,632E-01 | 3450 | 1,660E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,711E-01 | 1060 | 9,488E-01 | 2000 | 9,609E-01 | 3500 | 1,599E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,697E-01 | 1070 | 9,487E-01 | 2050 | 9,585E-01 | 3550 | 1,546E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,682E-01 | 1080 | 9,487E-01 | 2100 | 9,558E-01 | 3600 | 1,533E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,668E-01 | 1090 | 9,486E-01 | 2150 | 9,519E-01 | 3650 | 1,558E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## OG570

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,921 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 570 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 500 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 640 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,51 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,50 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

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

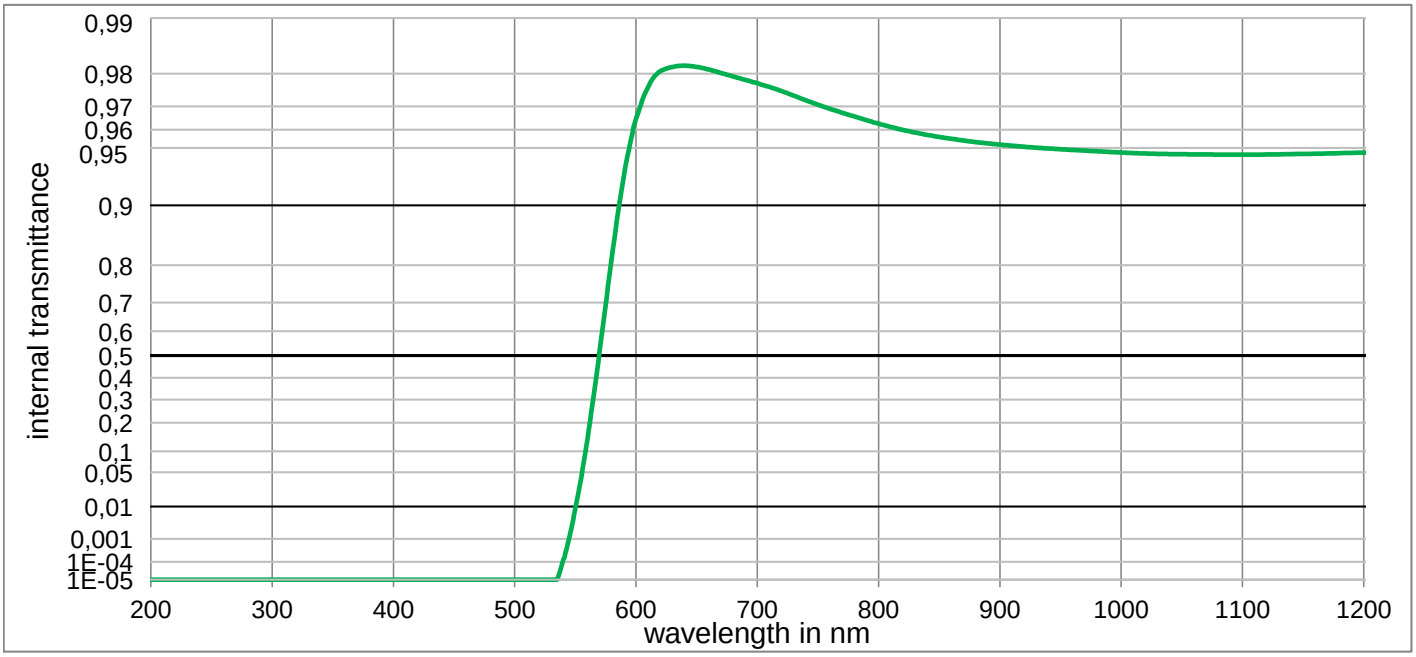
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = 510 °C | |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = 7,9 | |
| $\alpha_{(20°C/300°C)}$ | = 9,0 | |
| **Temperature coefficient** | | |
| Tk | = 0,12 | nm/K |

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

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

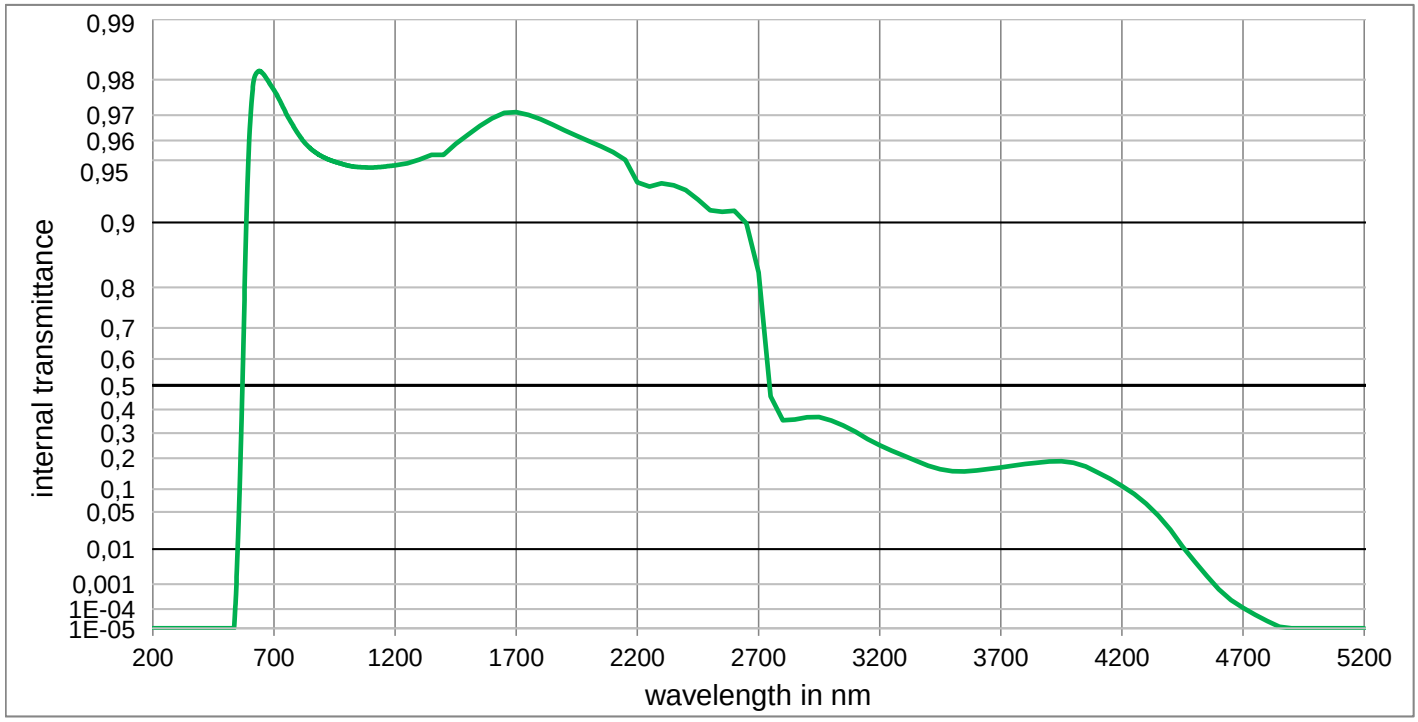
| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## OG570




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,629E-01 | 1100 | 9,457E-01 | 2200 | 9,360E-01 | 3700 | 1,671E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,613E-01 | 1110 | 9,458E-01 | 2250 | 9,328E-01 | 3750 | 1,730E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,599E-01 | 1120 | 9,458E-01 | 2300 | 9,352E-01 | 3800 | 1,787E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,586E-01 | 1130 | 9,459E-01 | 2350 | 9,337E-01 | 3850 | 1,839E-01 |
| 240 | < 1,0E-05 | 540 | 1,275E-04 | 840 | 9,574E-01 | 1140 | 9,461E-01 | 2400 | 9,302E-01 | 3900 | 1,879E-01 |
| 250 | < 1,0E-05 | 550 | 8,832E-03 | 850 | 9,563E-01 | 1150 | 9,462E-01 | 2450 | 9,224E-01 | 3950 | 1,893E-01 |
| 260 | < 1,0E-05 | 560 | 1,386E-01 | 860 | 9,553E-01 | 1160 | 9,464E-01 | 2500 | 9,125E-01 | 4000 | 1,838E-01 |
| 270 | < 1,0E-05 | 570 | 5,166E-01 | 870 | 9,544E-01 | 1170 | 9,465E-01 | 2550 | 9,111E-01 | 4050 | 1,700E-01 |
| 280 | < 1,0E-05 | 580 | 8,155E-01 | 880 | 9,535E-01 | 1180 | 9,467E-01 | 2600 | 9,121E-01 | 4100 | 1,503E-01 |
| 290 | < 1,0E-05 | 590 | 9,299E-01 | 890 | 9,527E-01 | 1190 | 9,469E-01 | 2650 | 8,991E-01 | 4150 | 1,297E-01 |
| 300 | < 1,0E-05 | 600 | 9,649E-01 | 900 | 9,520E-01 | 1200 | 9,470E-01 | 2700 | 8,288E-01 | 4200 | 1,090E-01 |
| 310 | < 1,0E-05 | 610 | 9,764E-01 | 910 | 9,513E-01 | 1250 | 9,483E-01 | 2750 | 4,551E-01 | 4250 | 8,758E-02 |
| 320 | < 1,000E-05 | 620 | 9,806E-01 | 920 | 9,507E-01 | 1300 | 9,503E-01 | 2800 | 3,544E-01 | 4300 | 6,582E-02 |
| 330 | < 1,000E-05 | 630 | 9,816E-01 | 930 | 9,502E-01 | 1350 | 9,529E-01 | 2850 | 3,574E-01 | 4350 | 4,375E-02 |
| 340 | < 1,000E-05 | 640 | 9,819E-01 | 940 | 9,497E-01 | 1400 | 9,529E-01 | 2900 | 3,675E-01 | 4400 | 2,518E-02 |
| 350 | < 1,000E-05 | 650 | 9,816E-01 | 950 | 9,492E-01 | 1450 | 9,584E-01 | 2950 | 3,676E-01 | 4450 | 1,145E-02 |
| 360 | < 1,000E-05 | 660 | 9,810E-01 | 960 | 9,488E-01 | 1500 | 9,625E-01 | 3000 | 3,531E-01 | 4500 | 4,940E-03 |
| 370 | < 1,000E-05 | 670 | 9,802E-01 | 970 | 9,483E-01 | 1550 | 9,661E-01 | 3050 | 3,320E-01 | 4550 | 1,875E-03 |
| 380 | < 1,000E-05 | 680 | 9,793E-01 | 980 | 9,479E-01 | 1600 | 9,689E-01 | 3100 | 3,052E-01 | 4600 | 6,610E-04 |
| 390 | < 1,000E-05 | 690 | 9,784E-01 | 990 | 9,475E-01 | 1650 | 9,708E-01 | 3150 | 2,759E-01 | 4650 | 2,500E-04 |
| 400 | < 1,000E-05 | 700 | 9,775E-01 | 1000 | 9,471E-01 | 1700 | 9,711E-01 | 3200 | 2,507E-01 | 4700 | 1,134E-04 |
| 410 | < 1,000E-05 | 710 | 9,764E-01 | 1010 | 9,468E-01 | 1750 | 9,701E-01 | 3250 | 2,286E-01 | 4750 | 5,284E-05 |
| 420 | < 1,000E-05 | 720 | 9,752E-01 | 1020 | 9,465E-01 | 1800 | 9,686E-01 | 3300 | 2,093E-01 | 4800 | 2,512E-05 |
| 430 | < 1,000E-05 | 730 | 9,737E-01 | 1030 | 9,463E-01 | 1850 | 9,666E-01 | 3350 | 1,906E-01 | 4850 | 1,226E-05 |
| 440 | < 1,000E-05 | 740 | 9,722E-01 | 1040 | 9,461E-01 | 1900 | 9,643E-01 | 3400 | 1,730E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,706E-01 | 1050 | 9,460E-01 | 1950 | 9,620E-01 | 3450 | 1,604E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,691E-01 | 1060 | 9,459E-01 | 2000 | 9,597E-01 | 3500 | 1,540E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,676E-01 | 1070 | 9,458E-01 | 2050 | 9,572E-01 | 3550 | 1,536E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,661E-01 | 1080 | 9,458E-01 | 2100 | 9,544E-01 | 3600 | 1,568E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,644E-01 | 1090 | 9,457E-01 | 2150 | 9,502E-01 | 3650 | 1,618E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## OG590

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,921 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 590 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 510 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,93) | = 660 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,51 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,50 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

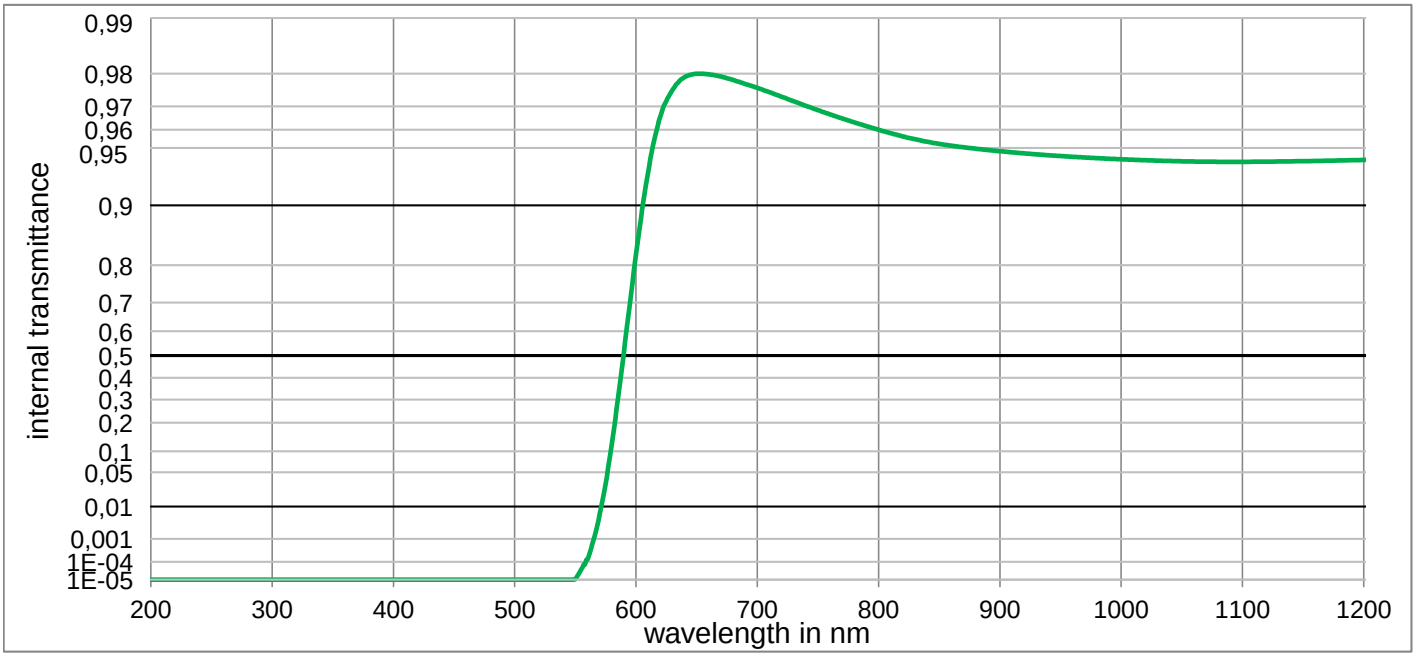
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| $\rho$ | = 2,56 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 448 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

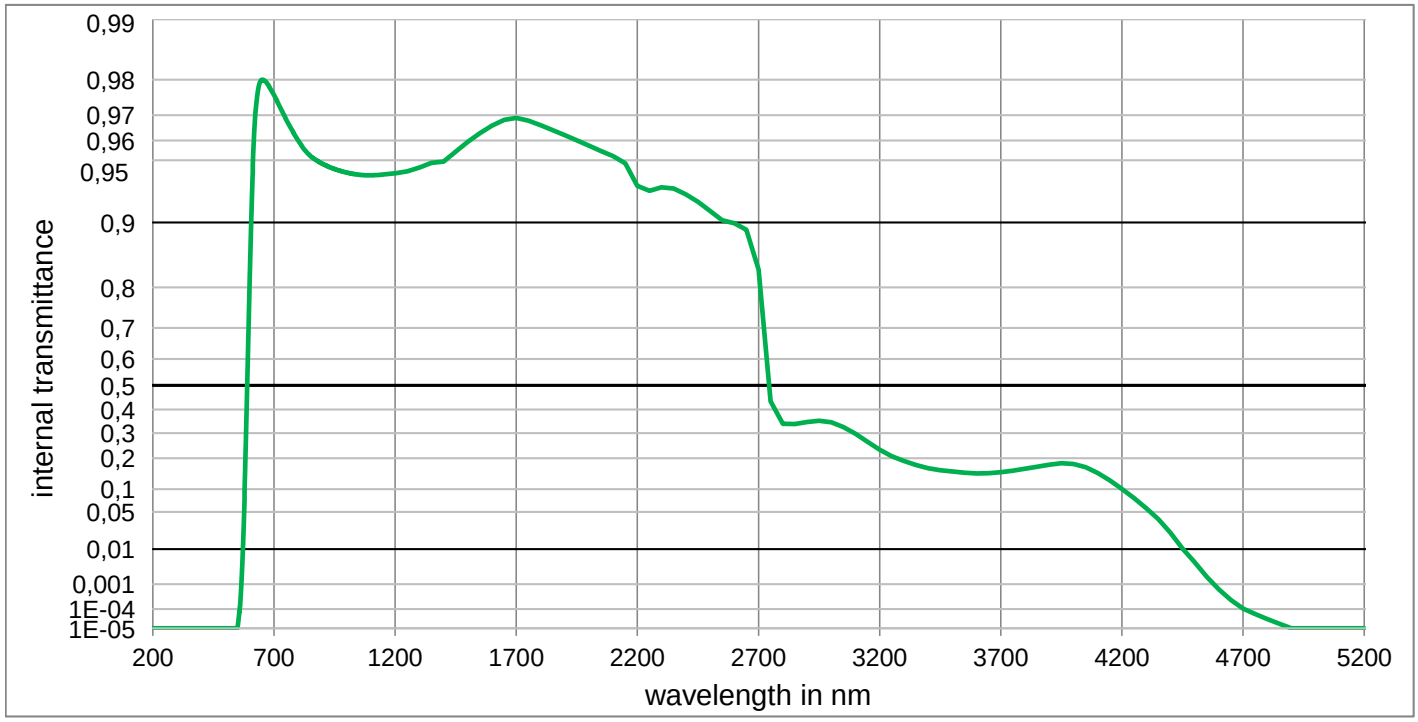
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,610 | 0,652 | 0,661 |
| | y | 0,361 | 0,347 | 0,338 |
| | Y | 27,3 | 21,5 | 19,2 |
| | $\lambda_d$ | 602 nm | 606 nm | 609 nm |
| | $P_e$ | 0,920 | 0,998 | 1,000 |
| Illuminant A | x | 0,639 | 0,662 | 0,669 |
| | y | 0,354 | 0,338 | 0,331 |
| | Y | 39,2 | 32,7 | 29,8 |
| | $\lambda_d$ | 605 nm | 609 nm | 611 nm |
| | $P_e$ | 0,956 | 0,998 | 0,999 |

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## OG590




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,600E-01 | 1100 | 9,408E-01 | 2200 | 9,334E-01 | 3700 | 1,509E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,583E-01 | 1110 | 9,408E-01 | 2250 | 9,295E-01 | 3750 | 1,558E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,566E-01 | 1120 | 9,409E-01 | 2300 | 9,323E-01 | 3800 | 1,624E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,551E-01 | 1130 | 9,410E-01 | 2350 | 9,313E-01 | 3850 | 1,697E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,537E-01 | 1140 | 9,411E-01 | 2400 | 9,267E-01 | 3900 | 1,765E-01 |
| 250 | < 1,0E-05 | 550 | 1,060E-05 | 850 | 9,524E-01 | 1150 | 9,413E-01 | 2450 | 9,205E-01 | 3950 | 1,813E-01 |
| 260 | < 1,0E-05 | 560 | 1,311E-04 | 860 | 9,514E-01 | 1160 | 9,414E-01 | 2500 | 9,117E-01 | 4000 | 1,794E-01 |
| 270 | < 1,0E-05 | 570 | 5,941E-03 | 870 | 9,504E-01 | 1170 | 9,416E-01 | 2550 | 9,024E-01 | 4050 | 1,678E-01 |
| 280 | < 1,0E-05 | 580 | 1,208E-01 | 880 | 9,495E-01 | 1180 | 9,418E-01 | 2600 | 8,992E-01 | 4100 | 1,480E-01 |
| 290 | < 1,0E-05 | 590 | 5,150E-01 | 890 | 9,488E-01 | 1190 | 9,420E-01 | 2650 | 8,917E-01 | 4150 | 1,246E-01 |
| 300 | < 1,0E-05 | 600 | 8,226E-01 | 900 | 9,480E-01 | 1200 | 9,421E-01 | 2700 | 8,337E-01 | 4200 | 1,006E-01 |
| 310 | < 1,0E-05 | 610 | 9,329E-01 | 910 | 9,473E-01 | 1250 | 9,434E-01 | 2750 | 4,344E-01 | 4250 | 7,750E-02 |
| 320 | < 1,000E-05 | 620 | 9,658E-01 | 920 | 9,466E-01 | 1300 | 9,457E-01 | 2800 | 3,392E-01 | 4300 | 5,680E-02 |
| 330 | < 1,000E-05 | 630 | 9,755E-01 | 930 | 9,459E-01 | 1350 | 9,485E-01 | 2850 | 3,381E-01 | 4350 | 3,854E-02 |
| 340 | < 1,000E-05 | 640 | 9,791E-01 | 940 | 9,454E-01 | 1400 | 9,493E-01 | 2900 | 3,473E-01 | 4400 | 2,229E-02 |
| 350 | < 1,000E-05 | 650 | 9,800E-01 | 950 | 9,448E-01 | 1450 | 9,547E-01 | 2950 | 3,524E-01 | 4450 | 1,033E-02 |
| 360 | < 1,000E-05 | 660 | 9,798E-01 | 960 | 9,443E-01 | 1500 | 9,594E-01 | 3000 | 3,453E-01 | 4500 | 4,710E-03 |
| 370 | < 1,000E-05 | 670 | 9,793E-01 | 970 | 9,438E-01 | 1550 | 9,632E-01 | 3050 | 3,252E-01 | 4550 | 1,742E-03 |
| 380 | < 1,000E-05 | 680 | 9,784E-01 | 980 | 9,434E-01 | 1600 | 9,662E-01 | 3100 | 2,969E-01 | 4600 | 6,577E-04 |
| 390 | < 1,000E-05 | 690 | 9,773E-01 | 990 | 9,430E-01 | 1650 | 9,684E-01 | 3150 | 2,648E-01 | 4650 | 2,483E-04 |
| 400 | < 1,000E-05 | 700 | 9,762E-01 | 1000 | 9,426E-01 | 1700 | 9,690E-01 | 3200 | 2,322E-01 | 4700 | 1,059E-04 |
| 410 | < 1,000E-05 | 710 | 9,748E-01 | 1010 | 9,422E-01 | 1750 | 9,681E-01 | 3250 | 2,078E-01 | 4750 | 5,728E-05 |
| 420 | < 1,000E-05 | 720 | 9,734E-01 | 1020 | 9,419E-01 | 1800 | 9,664E-01 | 3300 | 1,899E-01 | 4800 | 3,214E-05 |
| 430 | < 1,000E-05 | 730 | 9,718E-01 | 1030 | 9,416E-01 | 1850 | 9,645E-01 | 3350 | 1,755E-01 | 4850 | 1,832E-05 |
| 440 | < 1,000E-05 | 740 | 9,702E-01 | 1040 | 9,414E-01 | 1900 | 9,623E-01 | 3400 | 1,643E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 9,686E-01 | 1050 | 9,412E-01 | 1950 | 9,600E-01 | 3450 | 1,571E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,669E-01 | 1060 | 9,410E-01 | 2000 | 9,576E-01 | 3500 | 1,528E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,652E-01 | 1070 | 9,409E-01 | 2050 | 9,550E-01 | 3550 | 1,494E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,635E-01 | 1080 | 9,408E-01 | 2100 | 9,523E-01 | 3600 | 1,469E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,617E-01 | 1090 | 9,408E-01 | 2150 | 9,482E-01 | 3650 | 1,478E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG610

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,920 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 610 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 530 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,94) | = 690 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,51 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,50 |
| **Sellmeier coefficients** | |
| valid from 580 nm to 2330 nm | |
| $B_1$ = | 1,2549 |
| $B_2$ = | 0,0002 |
| $B_3$ = | 0,7981 |
| $C_1$ = | 9,761E-03 µm² |
| $C_2$ = | 2,8886E-01 µm² |
| $C_3$ = | 98,991 µm² |
| **Internal quality** | |
| Bubble class | 3 |

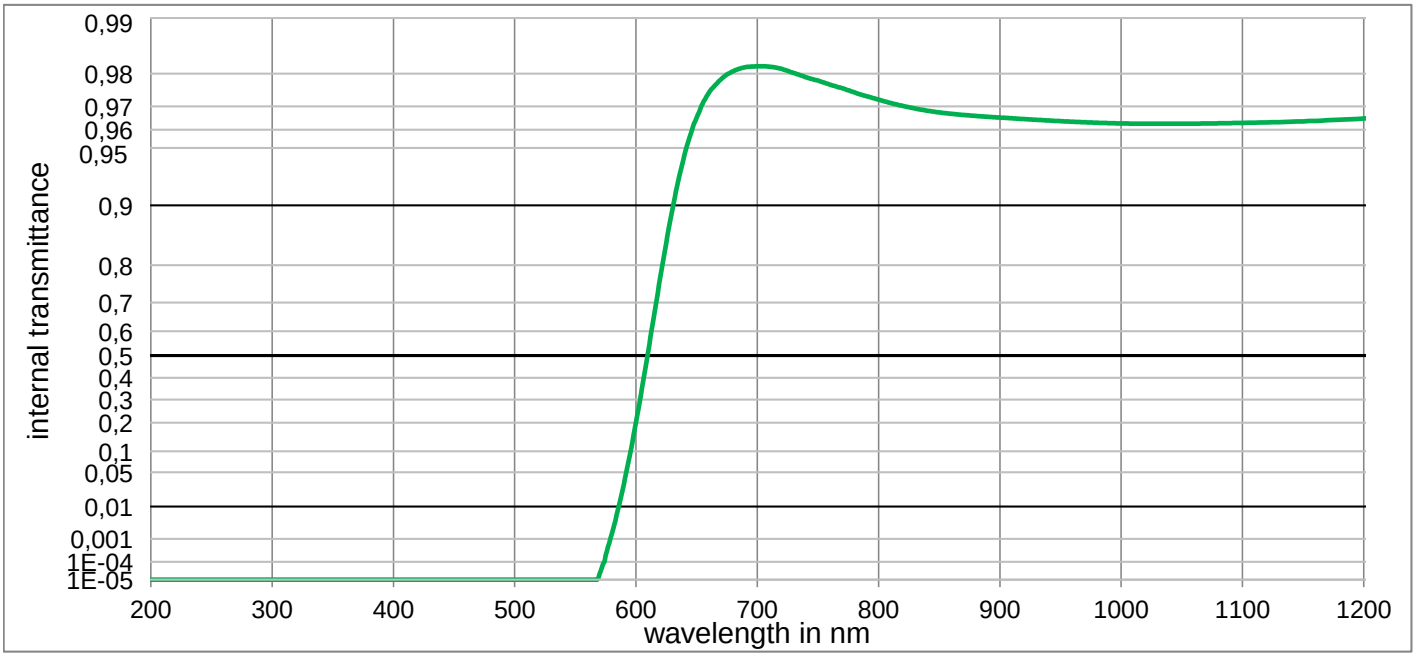
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,65 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 448 |

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

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

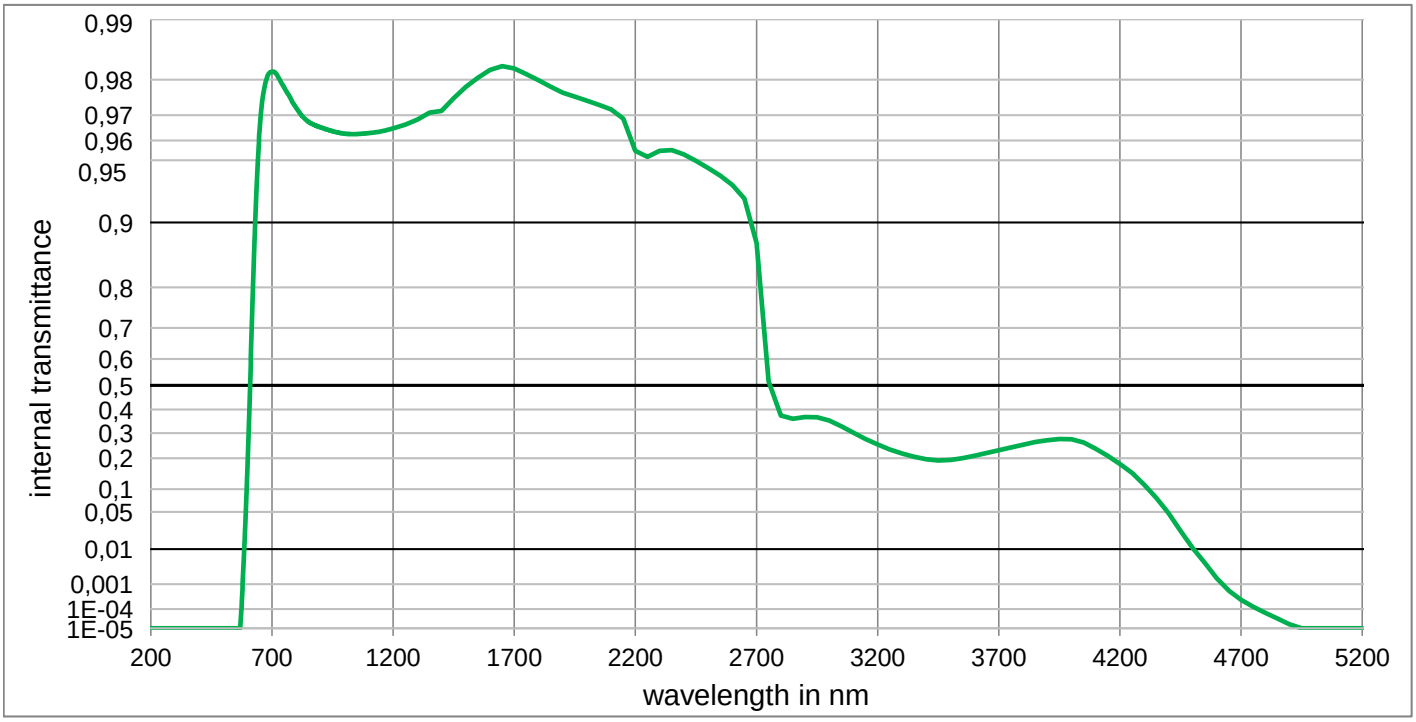
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,629 | 0,684 | 0,693 |
| | y | 0,330 | 0,315 | 0,307 |
| | Y | 17,4 | 11,9 | 9,9 |
| | $\lambda_d$ | 611 nm | 617 nm | 621 nm |
| | $P_e$ | 0,886 | 0,996 | 1,000 |
| Illuminant A | x | 0,663 |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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## RG610




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,724E-01 | 1100 | 9,632E-01 | 2200 | 9,550E-01 | 3700 | 2,302E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,713E-01 | 1110 | 9,633E-01 | 2250 | 9,519E-01 | 3750 | 2,411E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,702E-01 | 1120 | 9,635E-01 | 2300 | 9,550E-01 | 3800 | 2,527E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,692E-01 | 1130 | 9,636E-01 | 2350 | 9,554E-01 | 3850 | 2,631E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,684E-01 | 1140 | 9,637E-01 | 2400 | 9,532E-01 | 3900 | 2,708E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,677E-01 | 1150 | 9,639E-01 | 2450 | 9,496E-01 | 3950 | 2,756E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,671E-01 | 1160 | 9,641E-01 | 2500 | 9,454E-01 | 4000 | 2,742E-01 |
| 270 | < 1,0E-05 | 570 | 2,118E-05 | 870 | 9,667E-01 | 1170 | 9,644E-01 | 2550 | 9,405E-01 | 4050 | 2,614E-01 |
| 280 | < 1,0E-05 | 580 | 1,470E-03 | 880 | 9,663E-01 | 1180 | 9,646E-01 | 2600 | 9,339E-01 | 4100 | 2,362E-01 |
| 290 | < 1,0E-05 | 590 | 3,112E-02 | 890 | 9,659E-01 | 1190 | 9,649E-01 | 2650 | 9,232E-01 | 4150 | 2,080E-01 |
| 300 | < 1,0E-05 | 600 | 2,019E-01 | 900 | 9,656E-01 | 1200 | 9,652E-01 | 2700 | 8,746E-01 | 4200 | 1,793E-01 |
| 310 | < 1,0E-05 | 610 | 5,164E-01 | 910 | 9,653E-01 | 1250 | 9,666E-01 | 2750 | 5,165E-01 | 4250 | 1,482E-01 |
| 320 | < 1,000E-05 | 620 | 7,703E-01 | 920 | 9,649E-01 | 1300 | 9,685E-01 | 2800 | 3,748E-01 | 4300 | 1,123E-01 |
| 330 | < 1,000E-05 | 630 | 8,948E-01 | 930 | 9,646E-01 | 1350 | 9,708E-01 | 2850 | 3,606E-01 | 4350 | 7,840E-02 |
| 340 | < 1,000E-05 | 640 | 9,454E-01 | 940 | 9,643E-01 | 1400 | 9,715E-01 | 2900 | 3,684E-01 | 4400 | 4,815E-02 |
| 350 | < 1,000E-05 | 650 | 9,655E-01 | 950 | 9,640E-01 | 1450 | 9,753E-01 | 2950 | 3,671E-01 | 4450 | 2,387E-02 |
| 360 | < 1,000E-05 | 660 | 9,746E-01 | 960 | 9,638E-01 | 1500 | 9,783E-01 | 3000 | 3,529E-01 | 4500 | 1,073E-02 |
| 370 | < 1,000E-05 | 670 | 9,785E-01 | 970 | 9,635E-01 | 1550 | 9,804E-01 | 3050 | 3,291E-01 | 4550 | 4,530E-03 |
| 380 | < 1,000E-05 | 680 | 9,806E-01 | 980 | 9,633E-01 | 1600 | 9,821E-01 | 3100 | 3,018E-01 | 4600 | 1,580E-03 |
| 390 | < 1,000E-05 | 690 | 9,815E-01 | 990 | 9,631E-01 | 1650 | 9,829E-01 | 3150 | 2,753E-01 | 4650 | 5,741E-04 |
| 400 | < 1,000E-05 | 700 | 9,817E-01 | 1000 | 9,630E-01 | 1700 | 9,824E-01 | 3200 | 2,529E-01 | 4700 | 2,512E-04 |
| 410 | < 1,000E-05 | 710 | 9,817E-01 | 1010 | 9,629E-01 | 1750 | 9,812E-01 | 3250 | 2,334E-01 | 4750 | 1,279E-04 |
| 420 | < 1,000E-05 | 720 | 9,812E-01 | 1020 | 9,628E-01 | 1800 | 9,799E-01 | 3300 | 2,183E-01 | 4800 | 6,668E-05 |
| 430 | < 1,000E-05 | 730 | 9,802E-01 | 1030 | 9,628E-01 | 1850 | 9,783E-01 | 3350 | 2,060E-01 | 4850 | 3,420E-05 |
| 440 | < 1,000E-05 | 740 | 9,791E-01 | 1040 | 9,628E-01 | 1900 | 9,768E-01 | 3400 | 1,965E-01 | 4900 | 1,687E-05 |
| 450 | < 1,000E-05 | 750 | 9,782E-01 | 1050 | 9,628E-01 | 1950 | 9,757E-01 | 3450 | 1,917E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,771E-01 | 1060 | 9,629E-01 | 2000 | 9,746E-01 | 3500 | 1,933E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,761E-01 | 1070 | 9,630E-01 | 2050 | 9,733E-01 | 3550 | 1,999E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,748E-01 | 1080 | 9,630E-01 | 2100 | 9,719E-01 | 3600 | 2,098E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,736E-01 | 1090 | 9,631E-01 | 2150 | 9,688E-01 | 3650 | 2,201E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG630

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 630 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 540 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,94) | = 710 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

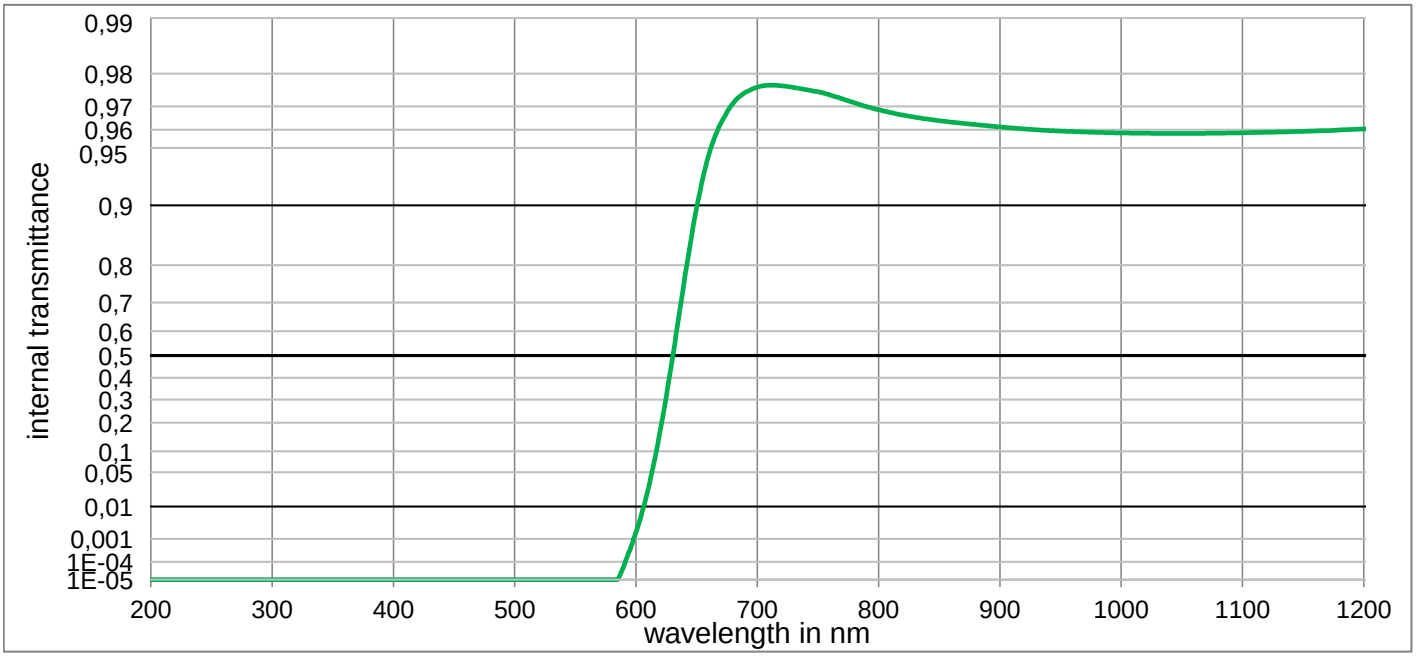
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,65 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 456 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

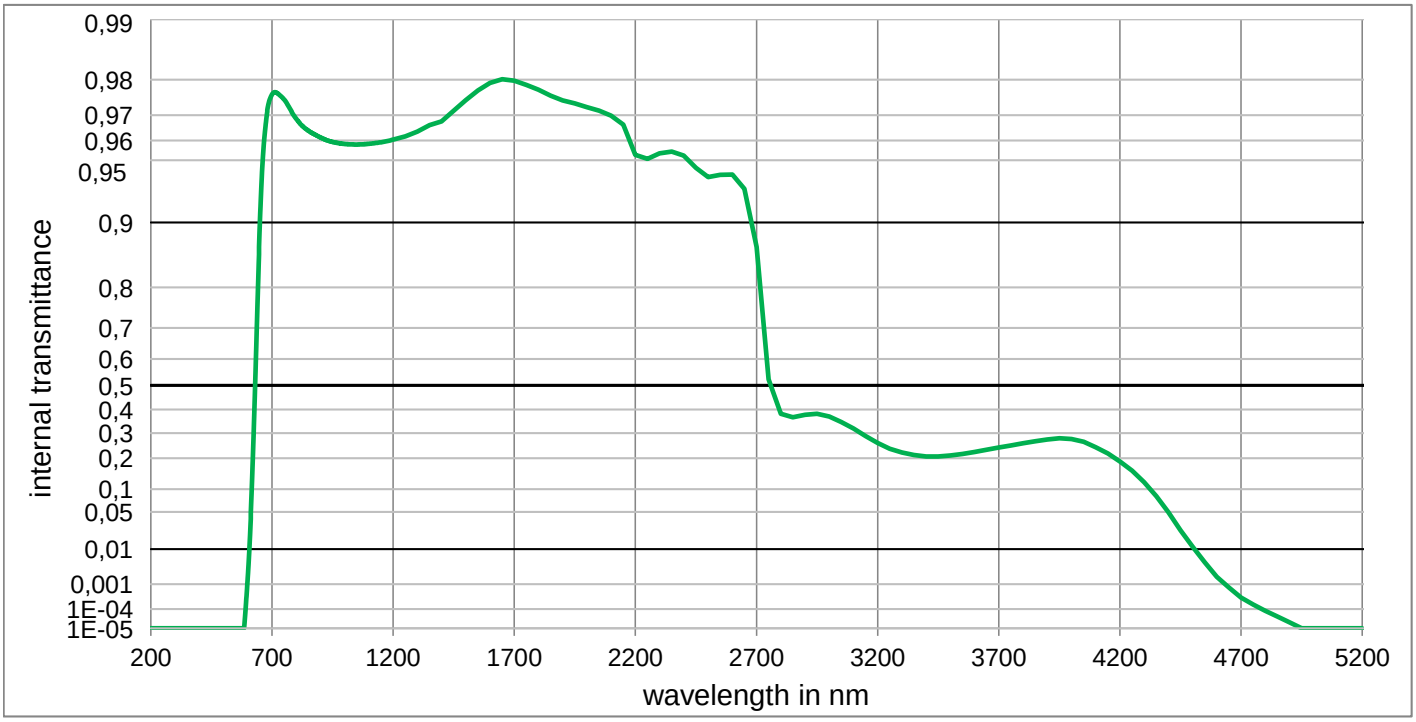
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,624 | 0,708 | 0,716 |
| | y | 0,305 | 0,289 | 0,284 |
| | Y | 9,3 | 5,1 | 4,0 |
| | $\lambda_d$ | 625 nm | 633 nm | 637 nm |
| | $P_e$ | 0,802 | 0,992 | 1,000 |
| Illuminant A | x | 0,678 | 0,712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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## RG630




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,688E-01 | 1100 | 9,585E-01 | 2200 | 9,530E-01 | 3700 | 2,410E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,676E-01 | 1110 | 9,586E-01 | 2250 | 9,509E-01 | 3750 | 2,495E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,666E-01 | 1120 | 9,587E-01 | 2300 | 9,537E-01 | 3800 | 2,579E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,657E-01 | 1130 | 9,589E-01 | 2350 | 9,546E-01 | 3850 | 2,660E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,649E-01 | 1140 | 9,590E-01 | 2400 | 9,525E-01 | 3900 | 2,735E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,642E-01 | 1150 | 9,592E-01 | 2450 | 9,456E-01 | 3950 | 2,783E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,636E-01 | 1160 | 9,594E-01 | 2500 | 9,395E-01 | 4000 | 2,755E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,630E-01 | 1170 | 9,596E-01 | 2550 | 9,412E-01 | 4050 | 2,645E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,625E-01 | 1180 | 9,598E-01 | 2600 | 9,412E-01 | 4100 | 2,425E-01 |
| 290 | < 1,0E-05 | 590 | 6,236E-05 | 890 | 9,619E-01 | 1190 | 9,601E-01 | 2650 | 9,312E-01 | 4150 | 2,177E-01 |
| 300 | < 1,0E-05 | 600 | 1,716E-03 | 900 | 9,614E-01 | 1200 | 9,604E-01 | 2700 | 8,695E-01 | 4200 | 1,884E-01 |
| 310 | < 1,0E-05 | 610 | 2,467E-02 | 910 | 9,608E-01 | 1250 | 9,619E-01 | 2750 | 5,243E-01 | 4250 | 1,559E-01 |
| 320 | < 1,000E-05 | 620 | 1,692E-01 | 920 | 9,604E-01 | 1300 | 9,638E-01 | 2800 | 3,813E-01 | 4300 | 1,198E-01 |
| 330 | < 1,000E-05 | 630 | 4,871E-01 | 930 | 9,600E-01 | 1350 | 9,664E-01 | 2850 | 3,670E-01 | 4350 | 8,250E-02 |
| 340 | < 1,000E-05 | 640 | 7,652E-01 | 940 | 9,596E-01 | 1400 | 9,678E-01 | 2900 | 3,776E-01 | 4400 | 4,948E-02 |
| 350 | < 1,000E-05 | 650 | 8,970E-01 | 950 | 9,593E-01 | 1450 | 9,715E-01 | 2950 | 3,817E-01 | 4450 | 2,448E-02 |
| 360 | < 1,000E-05 | 660 | 9,457E-01 | 960 | 9,591E-01 | 1500 | 9,748E-01 | 3000 | 3,698E-01 | 4500 | 1,133E-02 |
| 370 | < 1,000E-05 | 670 | 9,631E-01 | 970 | 9,589E-01 | 1550 | 9,774E-01 | 3050 | 3,471E-01 | 4550 | 4,684E-03 |
| 380 | < 1,000E-05 | 680 | 9,711E-01 | 980 | 9,587E-01 | 1600 | 9,792E-01 | 3100 | 3,189E-01 | 4600 | 1,739E-03 |
| 390 | < 1,000E-05 | 690 | 9,747E-01 | 990 | 9,585E-01 | 1650 | 9,801E-01 | 3150 | 2,884E-01 | 4650 | 7,540E-04 |
| 400 | < 1,000E-05 | 700 | 9,763E-01 | 1000 | 9,584E-01 | 1700 | 9,798E-01 | 3200 | 2,589E-01 | 4700 | 3,162E-04 |
| 410 | < 1,000E-05 | 710 | 9,769E-01 | 1010 | 9,583E-01 | 1750 | 9,788E-01 | 3250 | 2,366E-01 | 4750 | 1,596E-04 |
| 420 | < 1,000E-05 | 720 | 9,768E-01 | 1020 | 9,582E-01 | 1800 | 9,776E-01 | 3300 | 2,219E-01 | 4800 | 8,375E-05 |
| 430 | < 1,000E-05 | 730 | 9,763E-01 | 1030 | 9,582E-01 | 1850 | 9,760E-01 | 3350 | 2,117E-01 | 4850 | 4,355E-05 |
| 440 | < 1,000E-05 | 740 | 9,756E-01 | 1040 | 9,582E-01 | 1900 | 9,747E-01 | 3400 | 2,061E-01 | 4900 | 2,203E-05 |
| 450 | < 1,000E-05 | 750 | 9,749E-01 | 1050 | 9,581E-01 | 1950 | 9,737E-01 | 3450 | 2,064E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,740E-01 | 1060 | 9,582E-01 | 2000 | 9,727E-01 | 3500 | 2,103E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,727E-01 | 1070 | 9,582E-01 | 2050 | 9,715E-01 | 3550 | 2,160E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,713E-01 | 1080 | 9,583E-01 | 2100 | 9,698E-01 | 3600 | 2,240E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,700E-01 | 1090 | 9,584E-01 | 2150 | 9,666E-01 | 3650 | 2,323E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG645

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 645 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 560 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,94) | = 720 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,52 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| on request | |
| **Internal quality** | |
| Bubble class | 3 |

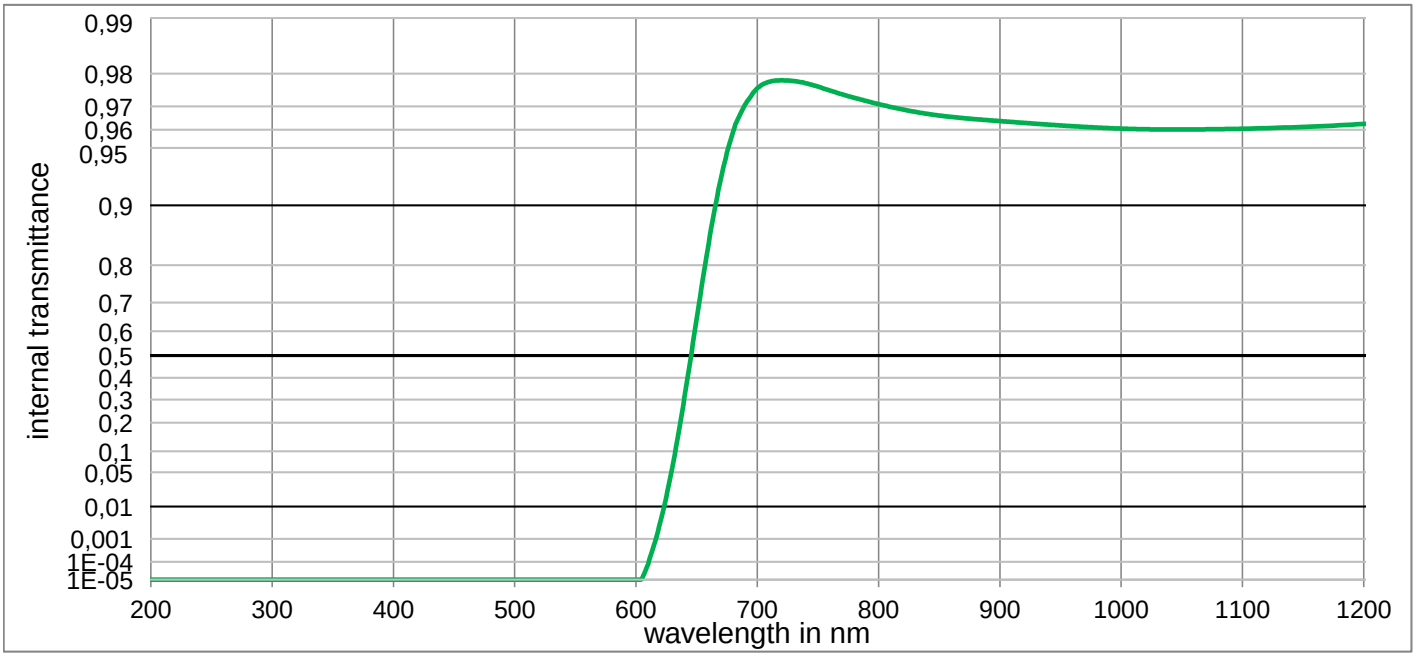
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,65 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 456 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

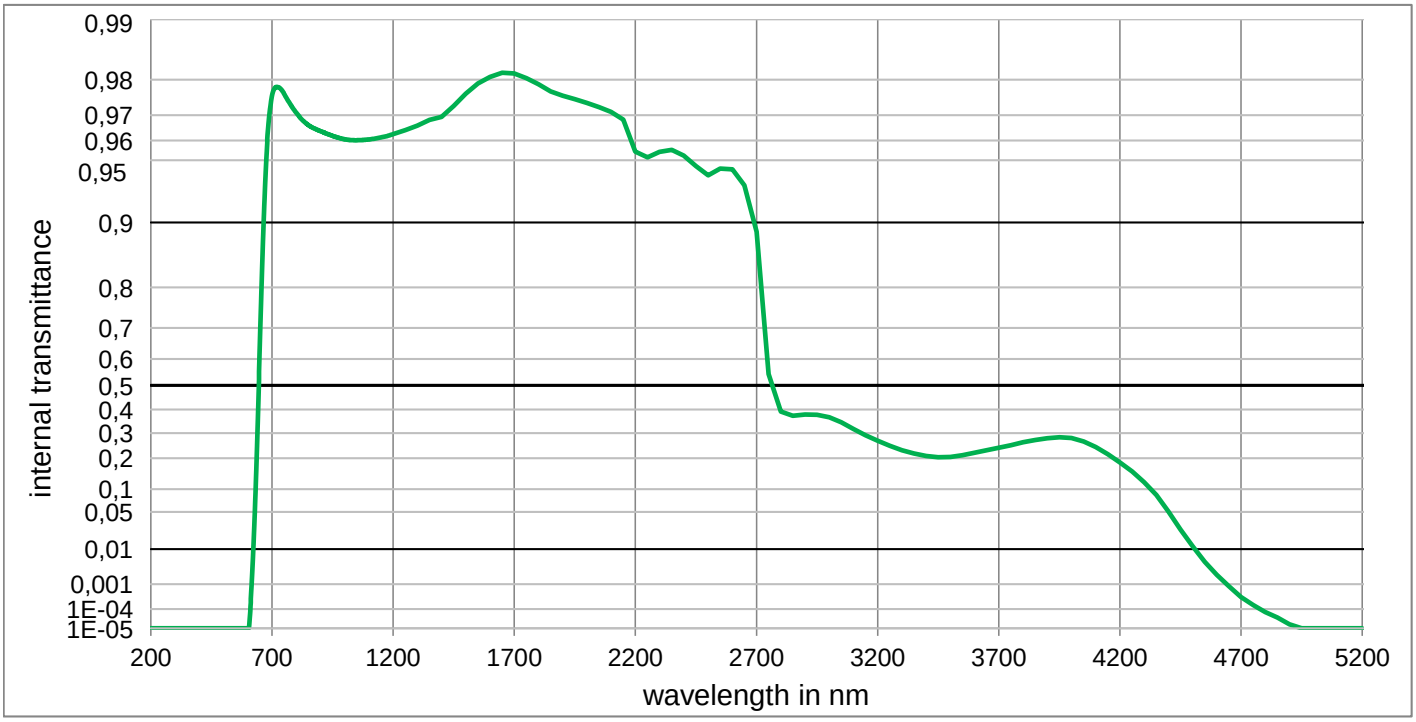
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,584 | 0,717 | 0,726 |
| | y | 0,298 | 0,278 | 0,274 |
| | Y | 5,4 | 2,4 | 1,8 |
| | $\lambda_d$ | 638 nm | 645 nm | 650 nm |
| | $P_e$ | 0,670 | 0,984 | 0,999 |
| Illuminant A | x | 0,672 | 0,722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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## RG645




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,708E-01 | 1100 | 9,605E-01 | 2200 | 9,547E-01 | 3700 | 2,399E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,698E-01 | 1110 | 9,606E-01 | 2250 | 9,516E-01 | 3750 | 2,503E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,688E-01 | 1120 | 9,608E-01 | 2300 | 9,545E-01 | 3800 | 2,623E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,679E-01 | 1130 | 9,610E-01 | 2350 | 9,555E-01 | 3850 | 2,714E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,671E-01 | 1140 | 9,611E-01 | 2400 | 9,525E-01 | 3900 | 2,787E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,664E-01 | 1150 | 9,613E-01 | 2450 | 9,466E-01 | 3950 | 2,827E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,658E-01 | 1160 | 9,616E-01 | 2500 | 9,408E-01 | 4000 | 2,792E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,653E-01 | 1170 | 9,618E-01 | 2550 | 9,451E-01 | 4050 | 2,656E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,649E-01 | 1180 | 9,621E-01 | 2600 | 9,447E-01 | 4100 | 2,436E-01 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,644E-01 | 1190 | 9,624E-01 | 2650 | 9,337E-01 | 4150 | 2,152E-01 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,641E-01 | 1200 | 9,628E-01 | 2700 | 8,894E-01 | 4200 | 1,844E-01 |
| 310 | < 1,0E-05 | 610 | 7,607E-05 | 910 | 9,636E-01 | 1250 | 9,644E-01 | 2750 | 5,439E-01 | 4250 | 1,529E-01 |
| 320 | < 1,000E-05 | 620 | 3,586E-03 | 920 | 9,632E-01 | 1300 | 9,662E-01 | 2800 | 3,916E-01 | 4300 | 1,199E-01 |
| 330 | < 1,000E-05 | 630 | 6,056E-02 | 930 | 9,628E-01 | 1350 | 9,684E-01 | 2850 | 3,738E-01 | 4350 | 8,517E-02 |
| 340 | < 1,000E-05 | 640 | 3,112E-01 | 940 | 9,624E-01 | 1400 | 9,694E-01 | 2900 | 3,791E-01 | 4400 | 5,083E-02 |
| 350 | < 1,000E-05 | 650 | 6,454E-01 | 950 | 9,621E-01 | 1450 | 9,730E-01 | 2950 | 3,779E-01 | 4450 | 2,517E-02 |
| 360 | < 1,000E-05 | 660 | 8,449E-01 | 960 | 9,617E-01 | 1500 | 9,765E-01 | 3000 | 3,671E-01 | 4500 | 1,162E-02 |
| 370 | < 1,000E-05 | 670 | 9,271E-01 | 970 | 9,614E-01 | 1550 | 9,791E-01 | 3050 | 3,455E-01 | 4550 | 4,841E-03 |
| 380 | < 1,000E-05 | 680 | 9,589E-01 | 980 | 9,611E-01 | 1600 | 9,806E-01 | 3100 | 3,177E-01 | 4600 | 2,037E-03 |
| 390 | < 1,000E-05 | 690 | 9,706E-01 | 990 | 9,608E-01 | 1650 | 9,815E-01 | 3150 | 2,911E-01 | 4650 | 8,337E-04 |
| 400 | < 1,000E-05 | 700 | 9,760E-01 | 1000 | 9,605E-01 | 1700 | 9,814E-01 | 3200 | 2,687E-01 | 4700 | 3,327E-04 |
| 410 | < 1,000E-05 | 710 | 9,779E-01 | 1010 | 9,604E-01 | 1750 | 9,804E-01 | 3250 | 2,482E-01 | 4750 | 1,524E-04 |
| 420 | < 1,000E-05 | 720 | 9,783E-01 | 1020 | 9,602E-01 | 1800 | 9,789E-01 | 3300 | 2,309E-01 | 4800 | 7,289E-05 |
| 430 | < 1,000E-05 | 730 | 9,781E-01 | 1030 | 9,602E-01 | 1850 | 9,772E-01 | 3350 | 2,176E-01 | 4850 | 3,837E-05 |
| 440 | < 1,000E-05 | 740 | 9,775E-01 | 1040 | 9,601E-01 | 1900 | 9,760E-01 | 3400 | 2,081E-01 | 4900 | 1,694E-05 |
| 450 | < 1,000E-05 | 750 | 9,765E-01 | 1050 | 9,601E-01 | 1950 | 9,750E-01 | 3450 | 2,036E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,754E-01 | 1060 | 9,602E-01 | 2000 | 9,739E-01 | 3500 | 2,049E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,742E-01 | 1070 | 9,602E-01 | 2050 | 9,726E-01 | 3550 | 2,113E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,730E-01 | 1080 | 9,603E-01 | 2100 | 9,711E-01 | 3600 | 2,208E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,719E-01 | 1090 | 9,604E-01 | 2150 | 9,684E-01 | 3650 | 2,302E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG665

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,918 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 665 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 580 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,96) | = 750 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,52 |
| $n_s$ ( 852 nm) | = 1,51 |
| $n_t$ (1014 nm) | = 1,51 |
| **Sellmeier coefficients** | |
| valid from 350 nm to 2400 nm | |
| $B_1$ = | 0,7958 |
| $B_2$ = | 0,4847 |
| $B_3$ = | 0,8880 |
| $C_1$ = | 5,130E-03 µm² |
| $C_2$ = | 1,8116E-02 µm² |
| $C_3$ = | 117,823 µm² |
| **Internal quality** | |
| Bubble class | 3 |

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

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

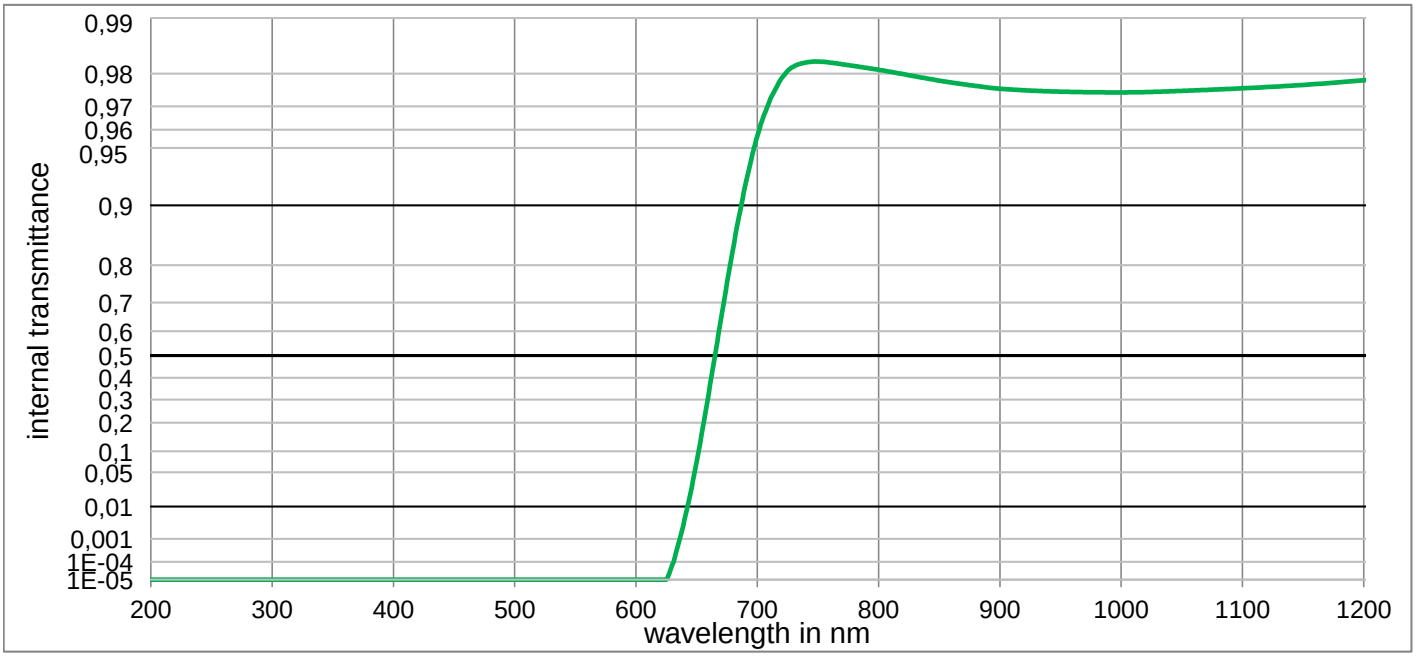
| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

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

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

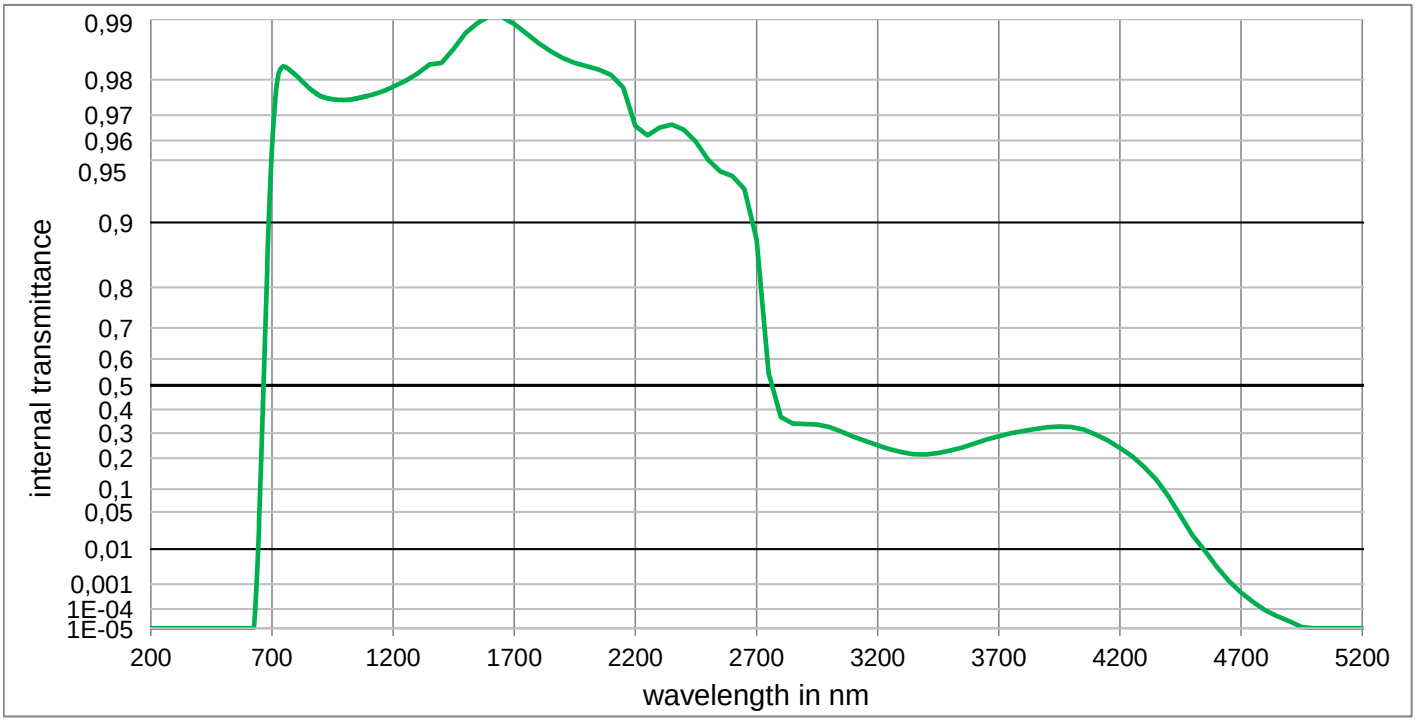
**Disclaimer**

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



# Data Sheet

## RG665




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,809E-01 | 1100 | 9,760E-01 | 2200 | 9,661E-01 | 3700 | 2,872E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,804E-01 | 1110 | 9,762E-01 | 2250 | 9,623E-01 | 3750 | 2,991E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,799E-01 | 1120 | 9,764E-01 | 2300 | 9,655E-01 | 3800 | 3,090E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,793E-01 | 1130 | 9,766E-01 | 2350 | 9,666E-01 | 3850 | 3,173E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,788E-01 | 1140 | 9,768E-01 | 2400 | 9,646E-01 | 3900 | 3,241E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,782E-01 | 1150 | 9,770E-01 | 2450 | 9,594E-01 | 3950 | 3,273E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,777E-01 | 1160 | 9,772E-01 | 2500 | 9,503E-01 | 4000 | 3,259E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,772E-01 | 1170 | 9,775E-01 | 2550 | 9,434E-01 | 4050 | 3,147E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,767E-01 | 1180 | 9,777E-01 | 2600 | 9,403E-01 | 4100 | 2,940E-01 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,763E-01 | 1190 | 9,780E-01 | 2650 | 9,310E-01 | 4150 | 2,697E-01 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,759E-01 | 1200 | 9,783E-01 | 2700 | 8,797E-01 | 4200 | 2,395E-01 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 9,756E-01 | 1250 | 9,797E-01 | 2750 | 5,478E-01 | 4250 | 2,072E-01 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 9,754E-01 | 1300 | 9,814E-01 | 2800 | 3,680E-01 | 4300 | 1,688E-01 |
| 330 | < 1,000E-05 | 630 | 7,438E-05 | 930 | 9,752E-01 | 1350 | 9,832E-01 | 2850 | 3,399E-01 | 4350 | 1,267E-01 |
| 340 | < 1,000E-05 | 640 | 4,275E-03 | 940 | 9,751E-01 | 1400 | 9,835E-01 | 2900 | 3,380E-01 | 4400 | 8,260E-02 |
| 350 | < 1,000E-05 | 650 | 7,177E-02 | 950 | 9,750E-01 | 1450 | 9,860E-01 | 2950 | 3,359E-01 | 4450 | 4,350E-02 |
| 360 | < 1,000E-05 | 660 | 3,297E-01 | 960 | 9,749E-01 | 1500 | 9,883E-01 | 3000 | 3,259E-01 | 4500 | 1,970E-02 |
| 370 | < 1,000E-05 | 670 | 6,426E-01 | 970 | 9,748E-01 | 1550 | 9,896E-01 | 3050 | 3,067E-01 | 4550 | 9,240E-03 |
| 380 | < 1,000E-05 | 680 | 8,339E-01 | 980 | 9,748E-01 | 1600 | 9,904E-01 | 3100 | 2,847E-01 | 4600 | 3,528E-03 |
| 390 | < 1,000E-05 | 690 | 9,205E-01 | 990 | 9,748E-01 | 1650 | 9,903E-01 | 3150 | 2,670E-01 | 4650 | 1,277E-03 |
| 400 | < 1,000E-05 | 700 | 9,567E-01 | 1000 | 9,748E-01 | 1700 | 9,895E-01 | 3200 | 2,501E-01 | 4700 | 4,966E-04 |
| 410 | < 1,000E-05 | 710 | 9,719E-01 | 1010 | 9,748E-01 | 1750 | 9,882E-01 | 3250 | 2,347E-01 | 4750 | 2,028E-04 |
| 420 | < 1,000E-05 | 720 | 9,788E-01 | 1020 | 9,749E-01 | 1800 | 9,869E-01 | 3300 | 2,224E-01 | 4800 | 8,730E-05 |
| 430 | < 1,000E-05 | 730 | 9,817E-01 | 1030 | 9,750E-01 | 1850 | 9,856E-01 | 3350 | 2,148E-01 | 4850 | 4,477E-05 |
| 440 | < 1,000E-05 | 740 | 9,826E-01 | 1040 | 9,751E-01 | 1900 | 9,844E-01 | 3400 | 2,144E-01 | 4900 | 2,472E-05 |
| 450 | < 1,000E-05 | 750 | 9,828E-01 | 1050 | 9,752E-01 | 1950 | 9,835E-01 | 3450 | 2,198E-01 | 4950 | 1,183E-05 |
| 460 | < 1,000E-05 | 760 | 9,826E-01 | 1060 | 9,754E-01 | 2000 | 9,828E-01 | 3500 | 2,290E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,822E-01 | 1070 | 9,755E-01 | 2050 | 9,822E-01 | 3550 | 2,412E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,818E-01 | 1080 | 9,757E-01 | 2100 | 9,811E-01 | 3600 | 2,577E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,814E-01 | 1090 | 9,758E-01 | 2150 | 9,781E-01 | 3650 | 2,734E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG695

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

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

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

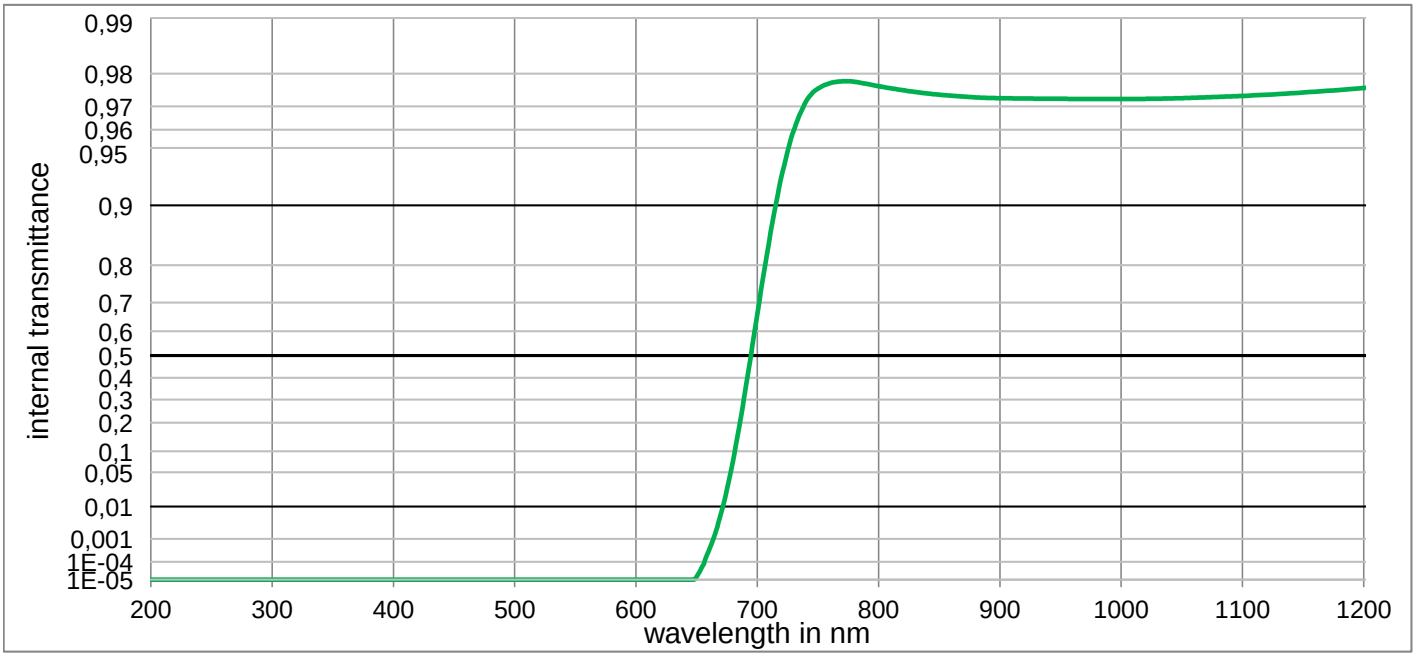
| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

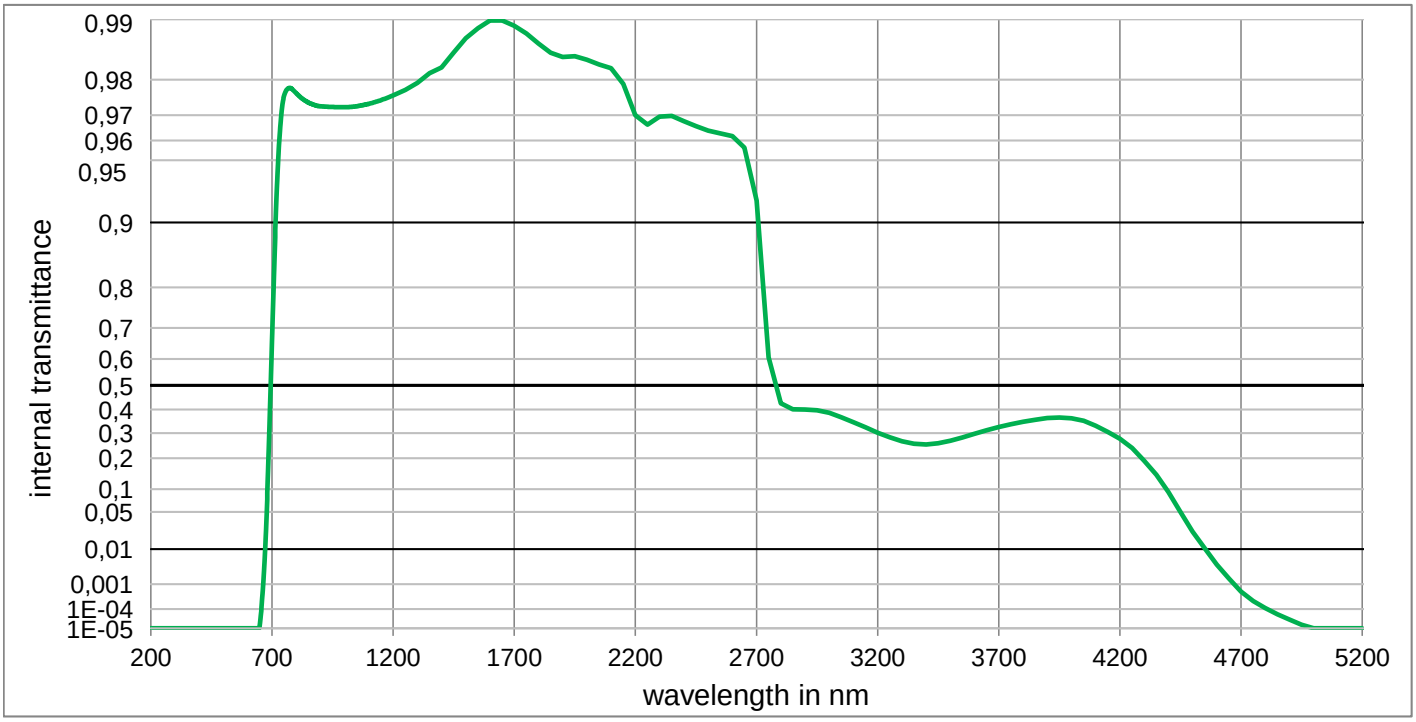
**Disclaimer**

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



# Data Sheet

## RG695




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,766E-01 | 1100 | 9,736E-01 | 2200 | 9,700E-01 | 3700 | 3,257E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,760E-01 | 1110 | 9,738E-01 | 2250 | 9,666E-01 | 3750 | 3,377E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,754E-01 | 1120 | 9,740E-01 | 2300 | 9,695E-01 | 3800 | 3,478E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,749E-01 | 1130 | 9,743E-01 | 2350 | 9,698E-01 | 3850 | 3,564E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,744E-01 | 1140 | 9,745E-01 | 2400 | 9,679E-01 | 3900 | 3,633E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,740E-01 | 1150 | 9,747E-01 | 2450 | 9,660E-01 | 3950 | 3,659E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,737E-01 | 1160 | 9,750E-01 | 2500 | 9,642E-01 | 4000 | 3,632E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,734E-01 | 1170 | 9,752E-01 | 2550 | 9,631E-01 | 4050 | 3,523E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,732E-01 | 1180 | 9,755E-01 | 2600 | 9,619E-01 | 4100 | 3,308E-01 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,730E-01 | 1190 | 9,758E-01 | 2650 | 9,567E-01 | 4150 | 3,050E-01 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,729E-01 | 1200 | 9,761E-01 | 2700 | 9,214E-01 | 4200 | 2,770E-01 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 9,728E-01 | 1250 | 9,775E-01 | 2750 | 6,057E-01 | 4250 | 2,394E-01 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 9,728E-01 | 1300 | 9,793E-01 | 2800 | 4,261E-01 | 4300 | 1,911E-01 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 9,727E-01 | 1350 | 9,814E-01 | 2850 | 4,014E-01 | 4350 | 1,424E-01 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 9,727E-01 | 1400 | 9,826E-01 | 2900 | 4,002E-01 | 4400 | 9,250E-02 |
| 350 | < 1,000E-05 | 650 | 1,534E-05 | 950 | 9,727E-01 | 1450 | 9,854E-01 | 2950 | 3,970E-01 | 4450 | 4,970E-02 |
| 360 | < 1,000E-05 | 660 | 3,350E-04 | 960 | 9,727E-01 | 1500 | 9,876E-01 | 3000 | 3,859E-01 | 4500 | 2,317E-02 |
| 370 | < 1,000E-05 | 670 | 6,330E-03 | 970 | 9,726E-01 | 1550 | 9,889E-01 | 3050 | 3,665E-01 | 4550 | 1,037E-02 |
| 380 | < 1,000E-05 | 680 | 7,498E-02 | 980 | 9,726E-01 | 1600 | 9,899E-01 | 3100 | 3,462E-01 | 4600 | 4,025E-03 |
| 390 | < 1,000E-05 | 690 | 3,367E-01 | 990 | 9,726E-01 | 1650 | 9,899E-01 | 3150 | 3,243E-01 | 4650 | 1,530E-03 |
| 400 | < 1,000E-05 | 700 | 6,612E-01 | 1000 | 9,726E-01 | 1700 | 9,892E-01 | 3200 | 3,018E-01 | 4700 | 5,346E-04 |
| 410 | < 1,000E-05 | 710 | 8,508E-01 | 1010 | 9,726E-01 | 1750 | 9,882E-01 | 3250 | 2,824E-01 | 4750 | 2,234E-04 |
| 420 | < 1,000E-05 | 720 | 9,295E-01 | 1020 | 9,727E-01 | 1800 | 9,868E-01 | 3300 | 2,667E-01 | 4800 | 1,104E-04 |
| 430 | < 1,000E-05 | 730 | 9,596E-01 | 1030 | 9,727E-01 | 1850 | 9,853E-01 | 3350 | 2,563E-01 | 4850 | 5,636E-05 |
| 440 | < 1,000E-05 | 740 | 9,716E-01 | 1040 | 9,728E-01 | 1900 | 9,846E-01 | 3400 | 2,535E-01 | 4900 | 3,062E-05 |
| 450 | < 1,000E-05 | 750 | 9,759E-01 | 1050 | 9,729E-01 | 1950 | 9,847E-01 | 3450 | 2,581E-01 | 4950 | 1,570E-05 |
| 460 | < 1,000E-05 | 760 | 9,775E-01 | 1060 | 9,730E-01 | 2000 | 9,841E-01 | 3500 | 2,681E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,780E-01 | 1070 | 9,732E-01 | 2050 | 9,832E-01 | 3550 | 2,819E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,779E-01 | 1080 | 9,733E-01 | 2100 | 9,825E-01 | 3600 | 2,973E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,773E-01 | 1090 | 9,735E-01 | 2150 | 9,790E-01 | 3650 | 3,121E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG715

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,914 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 715 nm ± 9 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 620 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,96) | = 810 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,54 |
| $n_s$ ( 852 nm) | = 1,53 |
| $n_t$ (1014 nm) | = 1,53 |
| **Sellmeier coefficients** | |
| valid from 440 nm to 1550 nm | |
| $B_1$ = | 0,8330 |
| $B_2$ = | 0,4883 |
| $B_3$ = | 6,5998 |
| $C_1$ = | 1,082E-02 µm² |
| $C_2$ = | 1,1301E-02 µm² |
| $C_3$ = | 855,262 µm² |
| **Internal quality** | |
| Bubble class | 3 |

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

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

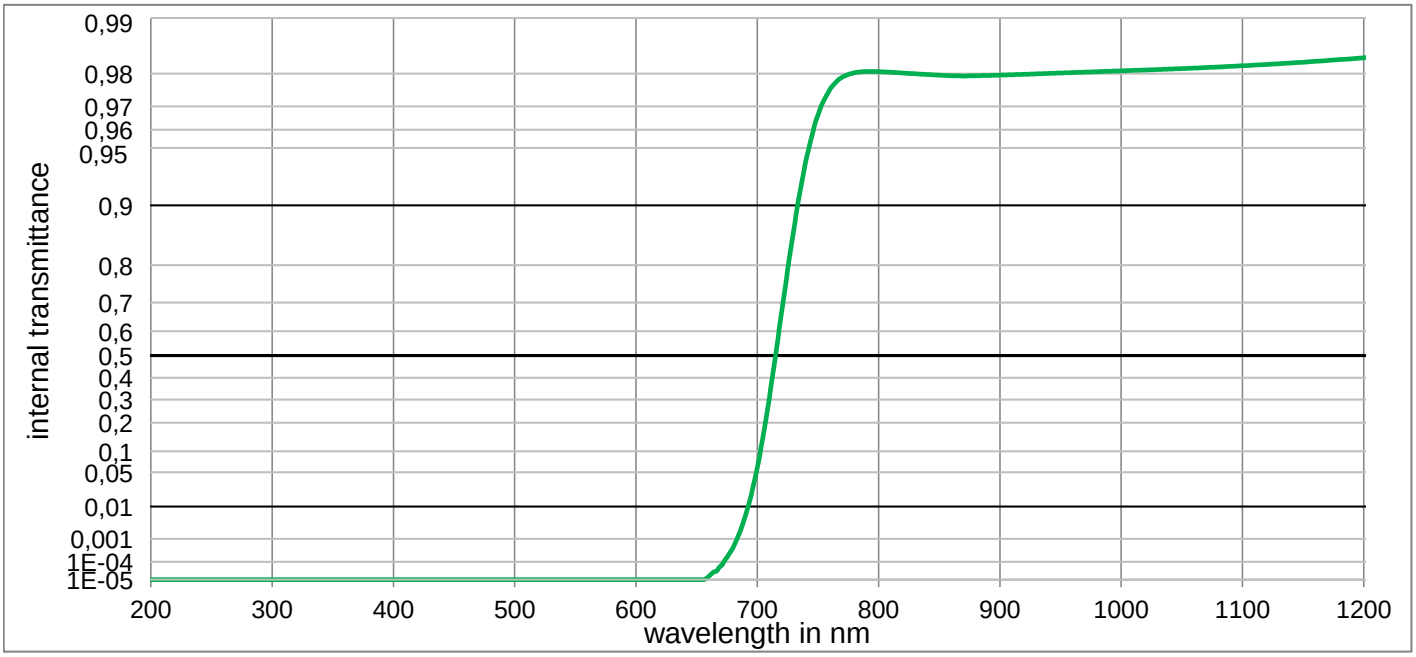
| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

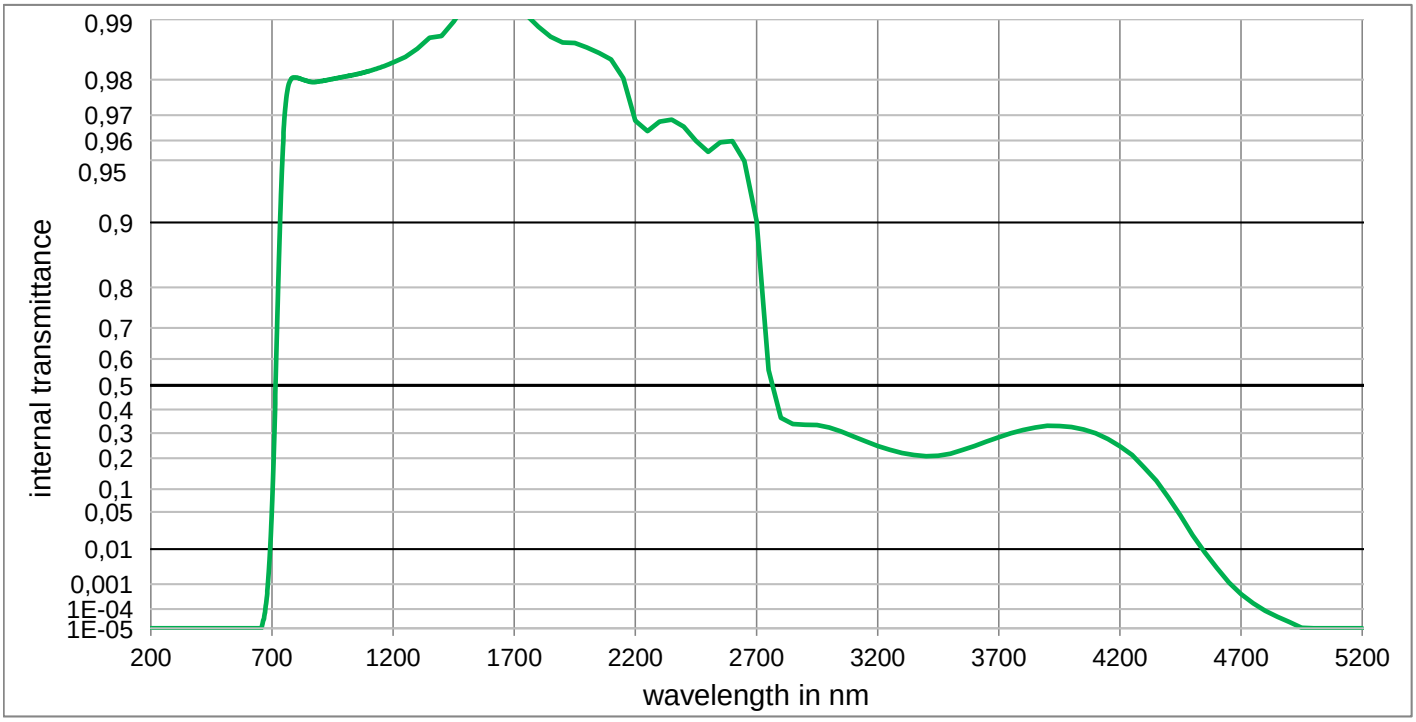
**Disclaimer**

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



# Data Sheet

## RG715




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,805E-01 | 1100 | 9,819E-01 | 2200 | 9,680E-01 | 3700 | 2,827E-01 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,804E-01 | 1110 | 9,820E-01 | 2250 | 9,641E-01 | 3750 | 2,995E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,802E-01 | 1120 | 9,822E-01 | 2300 | 9,678E-01 | 3800 | 3,127E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,800E-01 | 1130 | 9,823E-01 | 2350 | 9,684E-01 | 3850 | 3,232E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,798E-01 | 1140 | 9,825E-01 | 2400 | 9,658E-01 | 3900 | 3,305E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,796E-01 | 1150 | 9,827E-01 | 2450 | 9,598E-01 | 3950 | 3,302E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,795E-01 | 1160 | 9,828E-01 | 2500 | 9,545E-01 | 4000 | 3,252E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,794E-01 | 1170 | 9,830E-01 | 2550 | 9,592E-01 | 4050 | 3,154E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,795E-01 | 1180 | 9,832E-01 | 2600 | 9,597E-01 | 4100 | 2,993E-01 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,795E-01 | 1190 | 9,834E-01 | 2650 | 9,495E-01 | 4150 | 2,758E-01 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,796E-01 | 1200 | 9,836E-01 | 2700 | 9,017E-01 | 4200 | 2,464E-01 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 9,797E-01 | 1250 | 9,846E-01 | 2750 | 5,597E-01 | 4250 | 2,120E-01 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 9,798E-01 | 1300 | 9,860E-01 | 2800 | 3,653E-01 | 4300 | 1,666E-01 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 9,799E-01 | 1350 | 9,877E-01 | 2850 | 3,378E-01 | 4350 | 1,238E-01 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 9,801E-01 | 1400 | 9,879E-01 | 2900 | 3,356E-01 | 4400 | 7,960E-02 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | 9,802E-01 | 1450 | 9,897E-01 | 2950 | 3,336E-01 | 4450 | 4,376E-02 |
| 360 | < 1,000E-05 | 660 | 1,589E-05 | 960 | 9,803E-01 | 1500 | 9,917E-01 | 3000 | 3,236E-01 | 4500 | 1,980E-02 |
| 370 | < 1,000E-05 | 670 | 6,257E-05 | 970 | 9,804E-01 | 1550 | 9,927E-01 | 3050 | 3,067E-01 | 4550 | 8,430E-03 |
| 380 | < 1,000E-05 | 680 | 4,487E-04 | 980 | 9,805E-01 | 1600 | 9,932E-01 | 3100 | 2,864E-01 | 4600 | 3,292E-03 |
| 390 | < 1,000E-05 | 690 | 5,351E-03 | 990 | 9,806E-01 | 1650 | 9,929E-01 | 3150 | 2,660E-01 | 4650 | 1,132E-03 |
| 400 | < 1,000E-05 | 700 | 5,900E-02 | 1000 | 9,807E-01 | 1700 | 9,919E-01 | 3200 | 2,477E-01 | 4700 | 4,375E-04 |
| 410 | < 1,000E-05 | 710 | 3,110E-01 | 1010 | 9,808E-01 | 1750 | 9,905E-01 | 3250 | 2,325E-01 | 4750 | 1,791E-04 |
| 420 | < 1,000E-05 | 720 | 6,665E-01 | 1020 | 9,809E-01 | 1800 | 9,891E-01 | 3300 | 2,202E-01 | 4800 | 8,337E-05 |
| 430 | < 1,000E-05 | 730 | 8,663E-01 | 1030 | 9,810E-01 | 1850 | 9,878E-01 | 3350 | 2,120E-01 | 4850 | 4,236E-05 |
| 440 | < 1,000E-05 | 740 | 9,410E-01 | 1040 | 9,811E-01 | 1900 | 9,869E-01 | 3400 | 2,072E-01 | 4900 | 2,218E-05 |
| 450 | < 1,000E-05 | 750 | 9,666E-01 | 1050 | 9,812E-01 | 1950 | 9,869E-01 | 3450 | 2,093E-01 | 4950 | 1,076E-05 |
| 460 | < 1,000E-05 | 760 | 9,757E-01 | 1060 | 9,813E-01 | 2000 | 9,862E-01 | 3500 | 2,171E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,791E-01 | 1070 | 9,815E-01 | 2050 | 9,853E-01 | 3550 | 2,313E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,802E-01 | 1080 | 9,816E-01 | 2100 | 9,841E-01 | 3600 | 2,476E-01 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,805E-01 | 1090 | 9,817E-01 | 2150 | 9,803E-01 | 3650 | 2,649E-01 | 5150 | < 1,000E-05 |

# Data Sheet

## RG9

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,920 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (720 nm) | | ≤ | 0,45 |
| $\tau_i$ (800 nm) | | ≥ | 0,92 |
| $\tau_i$ (1060 nm) | | ≤ | 0,4 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,52 |
| $n_d$ (587,6 nm) | | = | 1,51 |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | 0,6332 | | |
| $B_2$ | 0,6287 | | |
| $B_3$ | 64,3526 | | |
| $C_1$ | 9,656E-03 | µm² | |
| $C_2$ | 9,6564E-03 | µm² | |
| $C_3$ | 7257,357 | µm² | |
| **Internal quality** | | | |
| Bubble class | 3 | | |

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

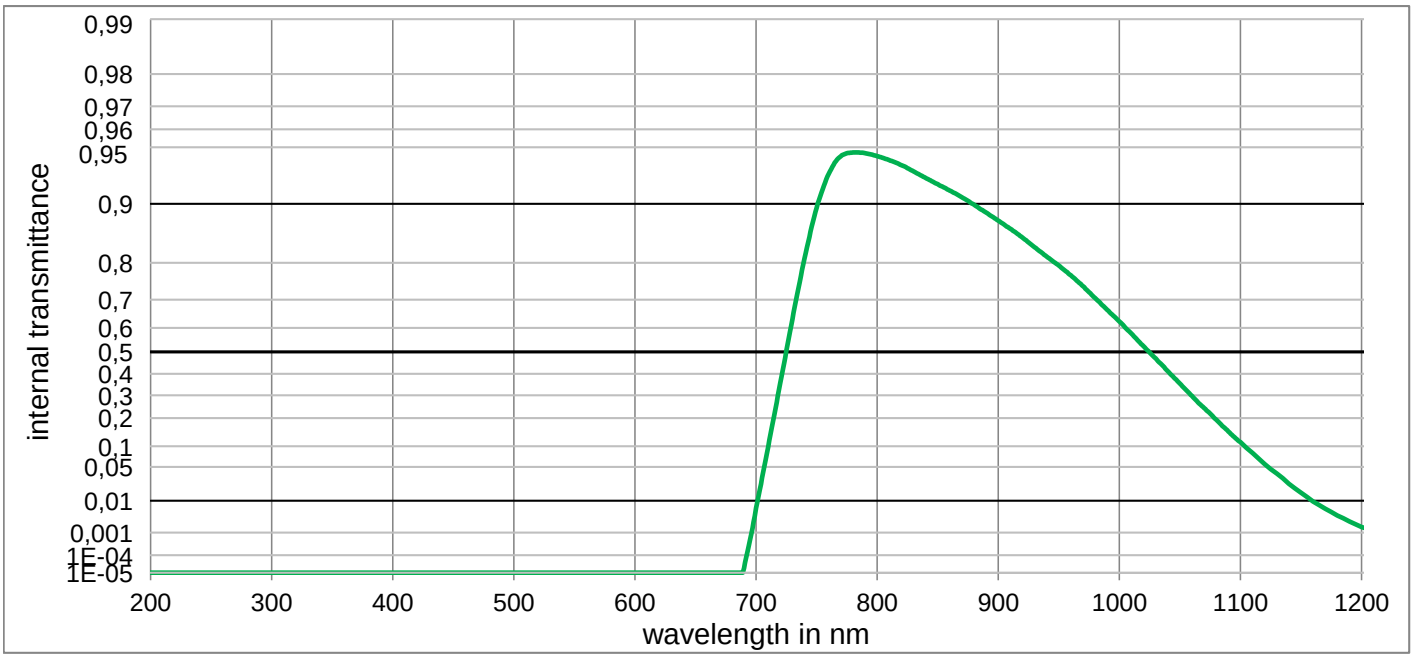
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 519 °C |
| **Thermal expansion in** | | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | | = | 7,9 |
| $\alpha_{(20°C/300°C)}$ | | = | 9,0 |
| **Temperature coefficient** | | | |
| | Tk | = | 0,06 nm/K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

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Robust glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

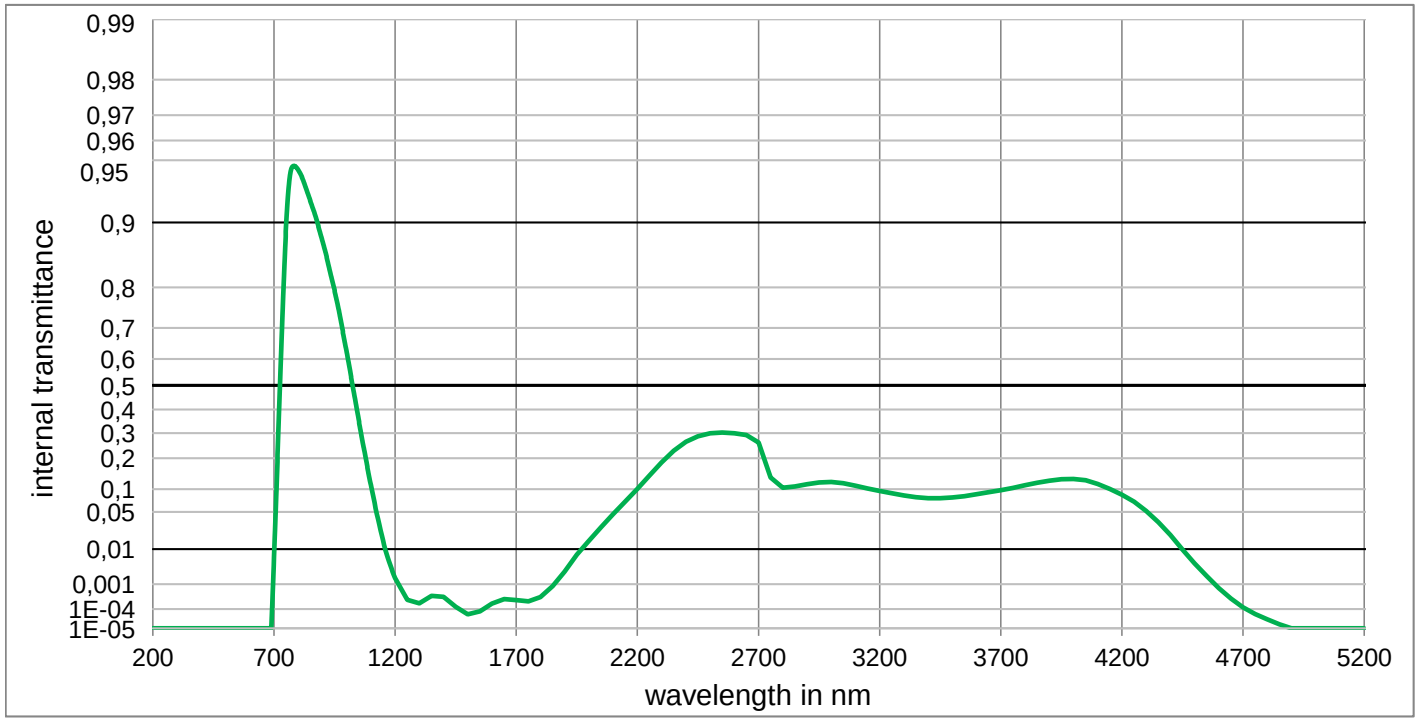
| Notes |
|---|
| |
| Bandpass filter / Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## RG9




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 9,442E-01 | 1100 | 1,124E-01 | 2200 | 1,008E-01 | 3700 | 9,734E-02 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,414E-01 | 1110 | 8,093E-02 | 2250 | 1,400E-01 | 3750 | 1,032E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,377E-01 | 1120 | 5,559E-02 | 2300 | 1,844E-01 | 3800 | 1,105E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,327E-01 | 1130 | 3,853E-02 | 2350 | 2,288E-01 | 3850 | 1,182E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,271E-01 | 1140 | 2,454E-02 | 2400 | 2,643E-01 | 3900 | 1,239E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,212E-01 | 1150 | 1,553E-02 | 2450 | 2,870E-01 | 3950 | 1,281E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,148E-01 | 1160 | 9,600E-03 | 2500 | 2,997E-01 | 4000 | 1,292E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,076E-01 | 1170 | 6,124E-03 | 2550 | 3,020E-01 | 4050 | 1,255E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 8,989E-01 | 1180 | 3,890E-03 | 2600 | 2,991E-01 | 4100 | 1,144E-01 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 8,889E-01 | 1190 | 2,500E-03 | 2650 | 2,922E-01 | 4150 | 1,006E-01 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 8,776E-01 | 1200 | 1,611E-03 | 2700 | 2,612E-01 | 4200 | 8,570E-02 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 8,651E-01 | 1250 | 2,518E-04 | 2750 | 1,342E-01 | 4250 | 6,981E-02 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 8,505E-01 | 1300 | 1,782E-04 | 2800 | 1,042E-01 | 4300 | 5,190E-02 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 8,328E-01 | 1350 | 3,698E-04 | 2850 | 1,074E-01 | 4350 | 3,430E-02 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 8,137E-01 | 1400 | 3,388E-04 | 2900 | 1,136E-01 | 4400 | 2,019E-02 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | 7,936E-01 | 1450 | 1,272E-04 | 2950 | 1,185E-01 | 4450 | 9,760E-03 |
| 360 | < 1,000E-05 | 660 | < 1,000E-05 | 960 | 7,697E-01 | 1500 | 5,674E-05 | 3000 | 1,203E-01 | 4500 | 4,410E-03 |
| 370 | < 1,000E-05 | 670 | < 1,000E-05 | 970 | 7,403E-01 | 1550 | 7,805E-05 | 3050 | 1,164E-01 | 4550 | 1,840E-03 |
| 380 | < 1,000E-05 | 680 | < 1,000E-05 | 980 | 7,052E-01 | 1600 | 1,738E-04 | 3100 | 1,094E-01 | 4600 | 7,240E-04 |
| 390 | < 1,000E-05 | 690 | 1,925E-05 | 990 | 6,662E-01 | 1650 | 2,710E-04 | 3150 | 1,016E-01 | 4650 | 2,825E-04 |
| 400 | < 1,000E-05 | 700 | 6,397E-03 | 1000 | 6,249E-01 | 1700 | 2,449E-04 | 3200 | 9,522E-02 | 4700 | 1,191E-04 |
| 410 | < 1,000E-05 | 710 | 9,896E-02 | 1010 | 5,770E-01 | 1750 | 2,216E-04 | 3250 | 8,942E-02 | 4750 | 5,808E-05 |
| 420 | < 1,000E-05 | 720 | 3,571E-01 | 1020 | 5,244E-01 | 1800 | 3,322E-04 | 3300 | 8,429E-02 | 4800 | 3,162E-05 |
| 430 | < 1,000E-05 | 730 | 6,334E-01 | 1030 | 4,702E-01 | 1850 | 8,561E-04 | 3350 | 7,998E-02 | 4850 | 1,690E-05 |
| 440 | < 1,000E-05 | 740 | 8,095E-01 | 1040 | 4,126E-01 | 1900 | 2,534E-03 | 3400 | 7,746E-02 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | 8,952E-01 | 1050 | 3,537E-01 | 1950 | 7,370E-03 | 3450 | 7,752E-02 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 9,306E-01 | 1060 | 2,968E-01 | 2000 | 1,525E-02 | 3500 | 7,945E-02 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 9,442E-01 | 1070 | 2,425E-01 | 2050 | 2,800E-02 | 3550 | 8,240E-02 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 9,467E-01 | 1080 | 1,938E-01 | 2100 | 4,638E-02 | 3600 | 8,704E-02 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 9,462E-01 | 1090 | 1,483E-01 | 2150 | 7,040E-02 | 3650 | 9,214E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## RG780

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

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

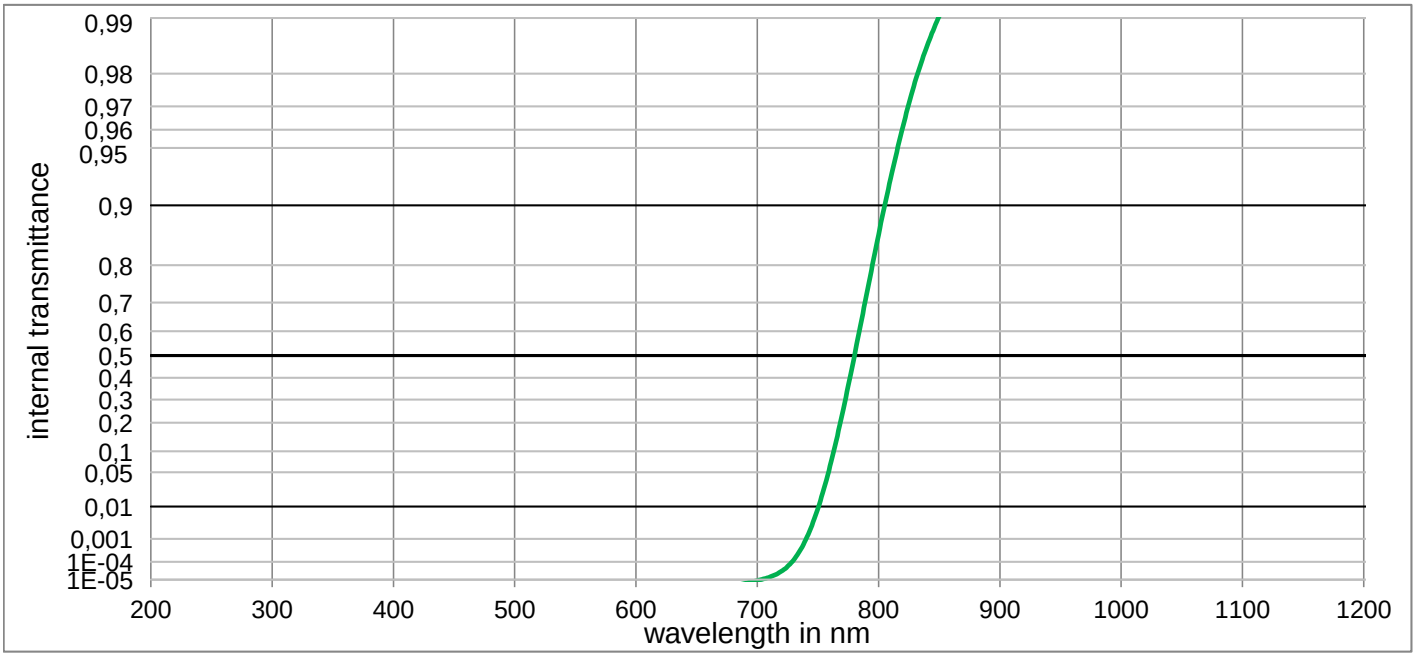
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = 552 °C | |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = 9,5 | |
| $\alpha_{(20°C/300°C)}$ | = 10,5 | |
| **Temperature coefficient** | | |
| Tk | = 0,22 | nm/K |

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 5 |
| SR class | = 53.4 |
| AR class | = 1.3 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

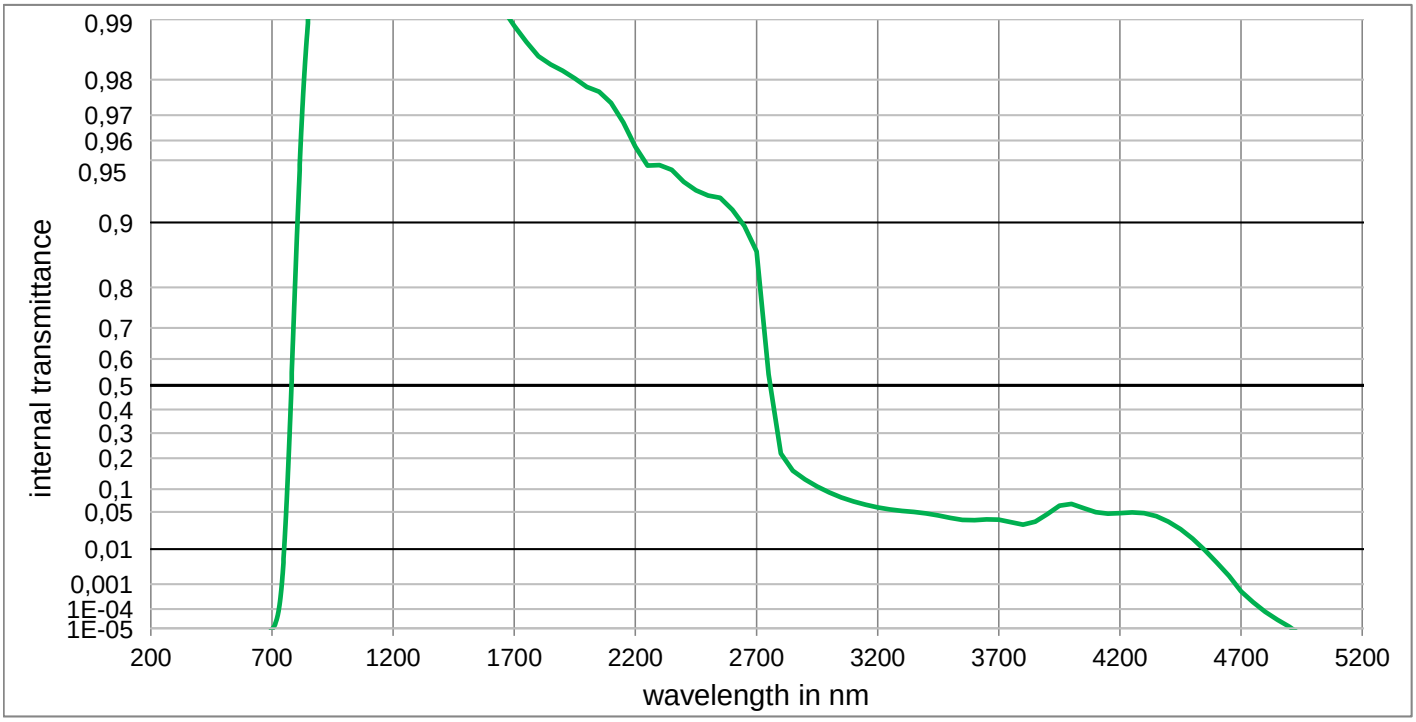
| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## RG780




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 8,585E-01 | 1100 | 9,944E-01 | 2200 | 9,571E-01 | 3700 | 3,777E-02 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,277E-01 | 1110 | 9,944E-01 | 2250 | 9,468E-01 | 3750 | 3,428E-02 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 9,614E-01 | 1120 | 9,944E-01 | 2300 | 9,472E-01 | 3800 | 3,105E-02 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,778E-01 | 1130 | 9,945E-01 | 2350 | 9,443E-01 | 3850 | 3,484E-02 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 9,858E-01 | 1140 | 9,945E-01 | 2400 | 9,363E-01 | 3900 | 4,632E-02 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 9,902E-01 | 1150 | 9,945E-01 | 2450 | 9,300E-01 | 3950 | 6,186E-02 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,910E-01 | 1160 | 9,945E-01 | 2500 | 9,257E-01 | 4000 | 6,493E-02 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,919E-01 | 1170 | 9,945E-01 | 2550 | 9,238E-01 | 4050 | 5,684E-02 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,924E-01 | 1180 | 9,946E-01 | 2600 | 9,131E-01 | 4100 | 4,949E-02 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,927E-01 | 1190 | 9,946E-01 | 2650 | 8,962E-01 | 4150 | 4,707E-02 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,929E-01 | 1200 | 9,947E-01 | 2700 | 8,629E-01 | 4200 | 4,802E-02 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 9,930E-01 | 1250 | 9,948E-01 | 2750 | 5,436E-01 | 4250 | 4,921E-02 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 9,931E-01 | 1300 | 9,950E-01 | 2800 | 2,180E-01 | 4300 | 4,794E-02 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 9,931E-01 | 1350 | 9,951E-01 | 2850 | 1,559E-01 | 4350 | 4,304E-02 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 9,931E-01 | 1400 | 9,930E-01 | 2900 | 1,279E-01 | 4400 | 3,517E-02 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | 9,930E-01 | 1450 | 9,933E-01 | 2950 | 1,071E-01 | 4450 | 2,583E-02 |
| 360 | < 1,000E-05 | 660 | < 1,000E-05 | 960 | 9,930E-01 | 1500 | 9,942E-01 | 3000 | 9,129E-02 | 4500 | 1,685E-02 |
| 370 | < 1,000E-05 | 670 | < 1,000E-05 | 970 | 9,933E-01 | 1550 | 9,938E-01 | 3050 | 7,961E-02 | 4550 | 9,430E-03 |
| 380 | < 1,000E-05 | 680 | < 1,000E-05 | 980 | 9,937E-01 | 1600 | 9,927E-01 | 3100 | 7,064E-02 | 4600 | 4,586E-03 |
| 390 | < 1,000E-05 | 690 | < 1,000E-05 | 990 | 9,939E-01 | 1650 | 9,912E-01 | 3150 | 6,354E-02 | 4650 | 1,887E-03 |
| 400 | < 1,000E-05 | 700 | < 1,000E-05 | 1000 | 9,940E-01 | 1700 | 9,892E-01 | 3200 | 5,827E-02 | 4700 | 5,470E-04 |
| 410 | < 1,000E-05 | 710 | 1,422E-05 | 1010 | 9,941E-01 | 1750 | 9,870E-01 | 3250 | 5,439E-02 | 4750 | 1,991E-04 |
| 420 | < 1,000E-05 | 720 | 3,155E-05 | 1020 | 9,942E-01 | 1800 | 9,847E-01 | 3300 | 5,195E-02 | 4800 | 7,430E-05 |
| 430 | < 1,000E-05 | 730 | 1,255E-04 | 1030 | 9,942E-01 | 1850 | 9,832E-01 | 3350 | 5,008E-02 | 4850 | 2,958E-05 |
| 440 | < 1,000E-05 | 740 | 9,334E-04 | 1040 | 9,942E-01 | 1900 | 9,820E-01 | 3400 | 4,755E-02 | 4900 | 1,222E-05 |
| 450 | < 1,000E-05 | 750 | 8,941E-03 | 1050 | 9,943E-01 | 1950 | 9,803E-01 | 3450 | 4,414E-02 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 6,268E-02 | 1060 | 9,943E-01 | 2000 | 9,783E-01 | 3500 | 4,020E-02 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 2,345E-01 | 1070 | 9,943E-01 | 2050 | 9,771E-01 | 3550 | 3,737E-02 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 4,959E-01 | 1080 | 9,943E-01 | 2100 | 9,739E-01 | 3600 | 3,722E-02 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 7,222E-01 | 1090 | 9,944E-01 | 2150 | 9,675E-01 | 3650 | 3,809E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## RG830

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

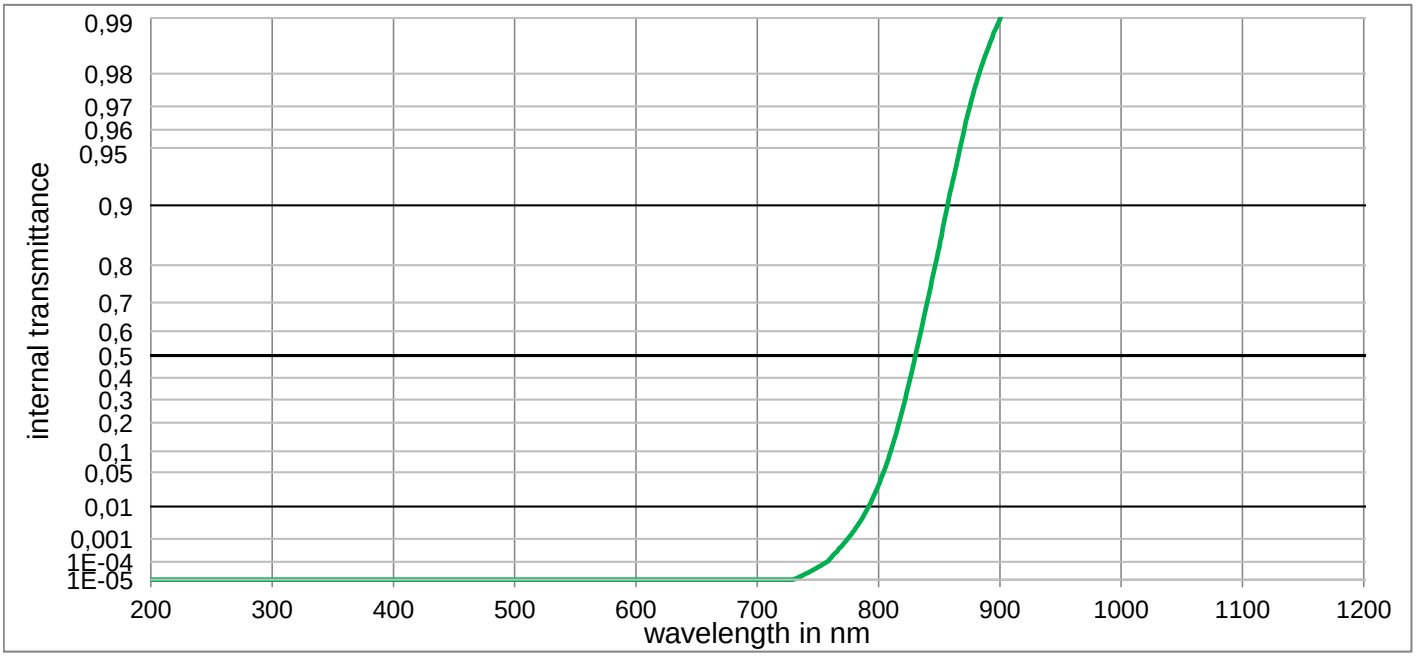
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 3,00 mm |
| **Density** | |
| ρ | = 2,94 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | = 436 |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 5 |
| SR class | = 53.4 |
| AR class | = 1.3 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

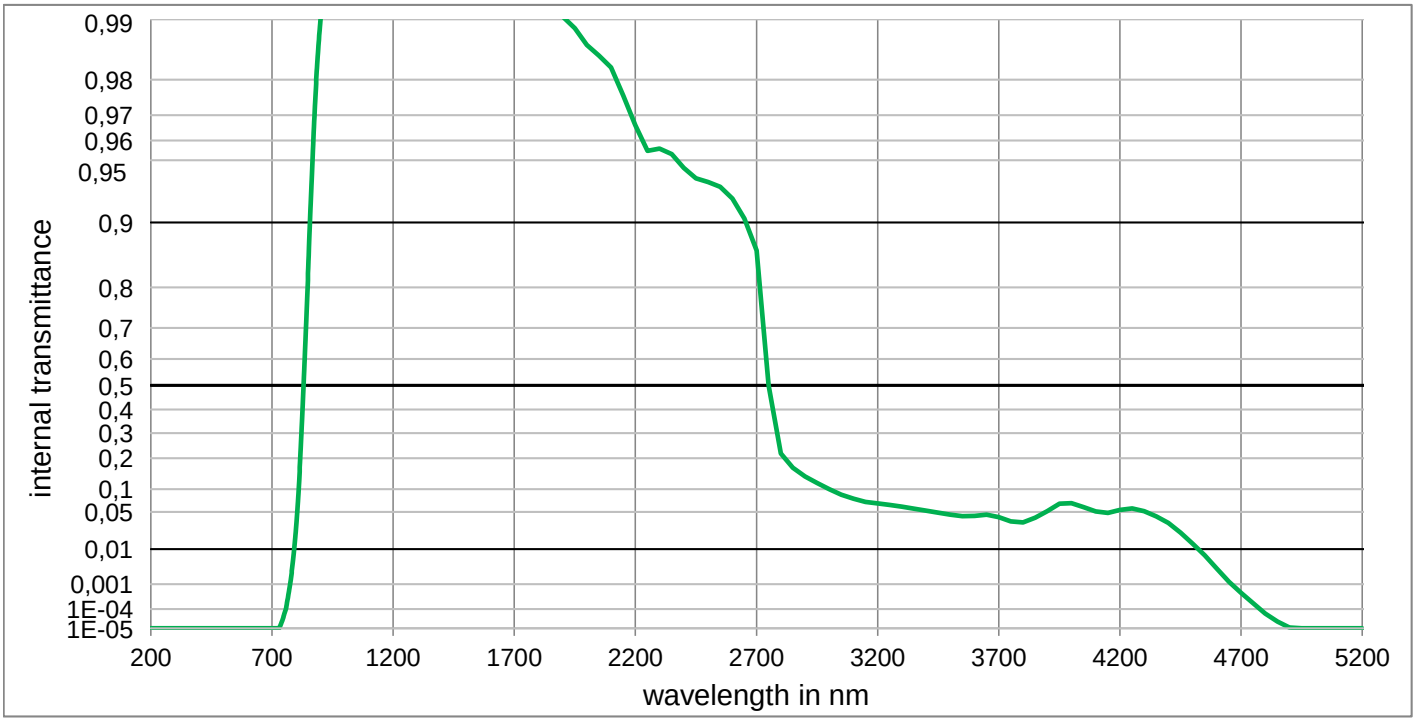
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## RG830




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 2,968E-02 | 1100 | 9,971E-01 | 2200 | 9,664E-01 | 3700 | 4,138E-02 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 9,936E-02 | 1110 | 9,971E-01 | 2250 | 9,550E-01 | 3750 | 3,550E-02 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 2,604E-01 | 1120 | 9,972E-01 | 2300 | 9,562E-01 | 3800 | 3,400E-02 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 4,901E-01 | 1130 | 9,973E-01 | 2350 | 9,533E-01 | 3850 | 4,058E-02 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 6,987E-01 | 1140 | 9,973E-01 | 2400 | 9,455E-01 | 3900 | 5,135E-02 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 8,366E-01 | 1150 | 9,974E-01 | 2450 | 9,387E-01 | 3950 | 6,590E-02 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 9,189E-01 | 1160 | 9,975E-01 | 2500 | 9,361E-01 | 4000 | 6,660E-02 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 9,582E-01 | 1170 | 9,976E-01 | 2550 | 9,326E-01 | 4050 | 5,851E-02 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,768E-01 | 1180 | 9,976E-01 | 2600 | 9,232E-01 | 4100 | 5,083E-02 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,852E-01 | 1190 | 9,977E-01 | 2650 | 9,041E-01 | 4150 | 4,831E-02 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,899E-01 | 1200 | 9,978E-01 | 2700 | 8,646E-01 | 4200 | 5,371E-02 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 9,927E-01 | 1250 | 9,983E-01 | 2750 | 5,000E-01 | 4250 | 5,637E-02 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 9,943E-01 | 1300 | 9,989E-01 | 2800 | 2,183E-01 | 4300 | 5,122E-02 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 9,951E-01 | 1350 | 9,997E-01 | 2850 | 1,663E-01 | 4350 | 4,271E-02 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 9,954E-01 | 1400 | 9,985E-01 | 2900 | 1,371E-01 | 4400 | 3,328E-02 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | 9,956E-01 | 1450 | 9,987E-01 | 2950 | 1,170E-01 | 4450 | 2,234E-02 |
| 360 | < 1,000E-05 | 660 | < 1,000E-05 | 960 | 9,958E-01 | 1500 | 9,998E-01 | 3000 | 1,002E-01 | 4500 | 1,333E-02 |
| 370 | < 1,000E-05 | 670 | < 1,000E-05 | 970 | 9,959E-01 | 1550 | 9,999E-01 | 3050 | 8,620E-02 | 4550 | 7,120E-03 |
| 380 | < 1,000E-05 | 680 | < 1,000E-05 | 980 | 9,960E-01 | 1600 | 9,997E-01 | 3100 | 7,650E-02 | 4600 | 3,120E-03 |
| 390 | < 1,000E-05 | 690 | < 1,000E-05 | 990 | 9,961E-01 | 1650 | 9,984E-01 | 3150 | 6,962E-02 | 4650 | 1,208E-03 |
| 400 | < 1,000E-05 | 700 | < 1,000E-05 | 1000 | 9,962E-01 | 1700 | 9,965E-01 | 3200 | 6,599E-02 | 4700 | 4,875E-04 |
| 410 | < 1,000E-05 | 710 | < 1,000E-05 | 1010 | 9,963E-01 | 1750 | 9,942E-01 | 3250 | 6,294E-02 | 4750 | 1,828E-04 |
| 420 | < 1,000E-05 | 720 | < 1,000E-05 | 1020 | 9,964E-01 | 1800 | 9,924E-01 | 3300 | 5,949E-02 | 4800 | 6,152E-05 |
| 430 | < 1,000E-05 | 730 | 1,025E-05 | 1030 | 9,965E-01 | 1850 | 9,911E-01 | 3350 | 5,595E-02 | 4850 | 2,366E-05 |
| 440 | < 1,000E-05 | 740 | 2,262E-05 | 1040 | 9,966E-01 | 1900 | 9,903E-01 | 3400 | 5,237E-02 | 4900 | 1,099E-05 |
| 450 | < 1,000E-05 | 750 | 5,207E-05 | 1050 | 9,967E-01 | 1950 | 9,889E-01 | 3450 | 4,889E-02 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 1,421E-04 | 1060 | 9,967E-01 | 2000 | 9,866E-01 | 3500 | 4,561E-02 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 5,562E-04 | 1070 | 9,968E-01 | 2050 | 9,848E-01 | 3550 | 4,294E-02 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 2,044E-03 | 1080 | 9,969E-01 | 2100 | 9,826E-01 | 3600 | 4,356E-02 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 7,784E-03 | 1090 | 9,970E-01 | 2150 | 9,760E-01 | 3650 | 4,528E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## RG850

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

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

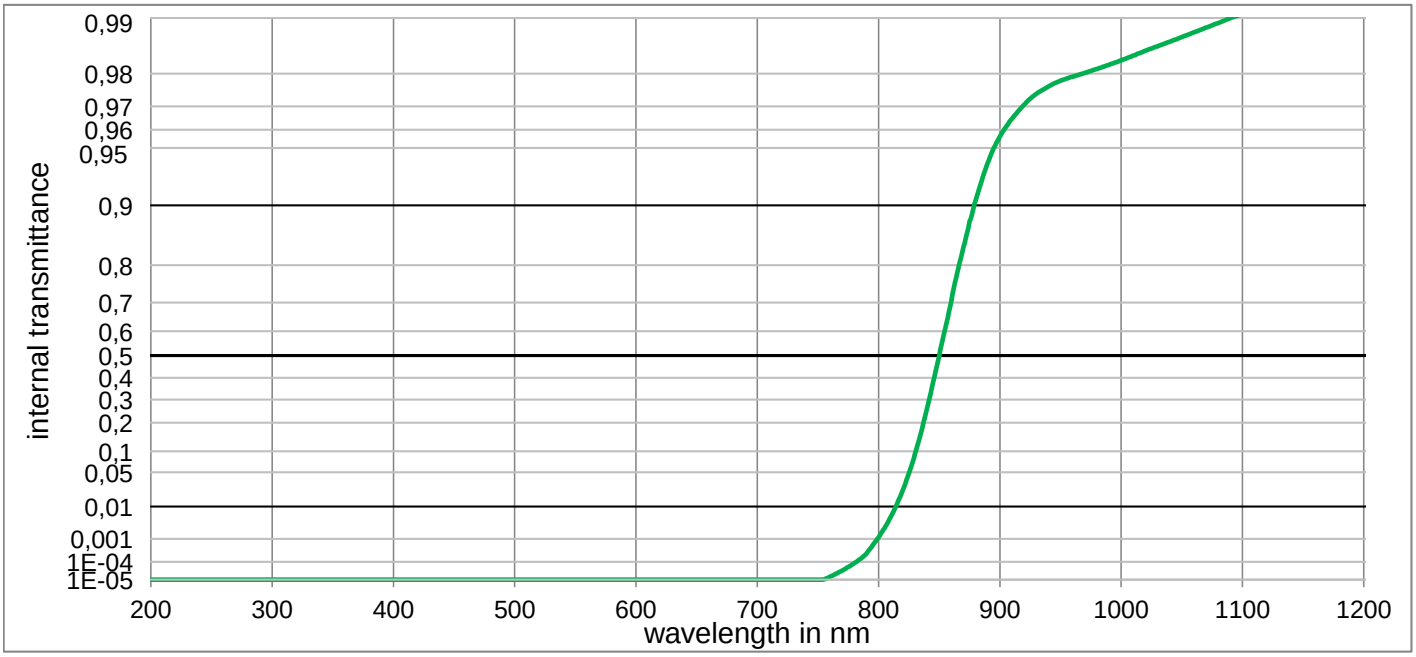
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = 554 °C | |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = 9,5 | |
| $\alpha_{(20°C/300°C)}$ | = 10,5 | |
| **Temperature coefficient** | | |
| Tk | = 0,24 | nm/K |

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 5 |
| SR class | = 53.4 |
| AR class | = 1.3 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

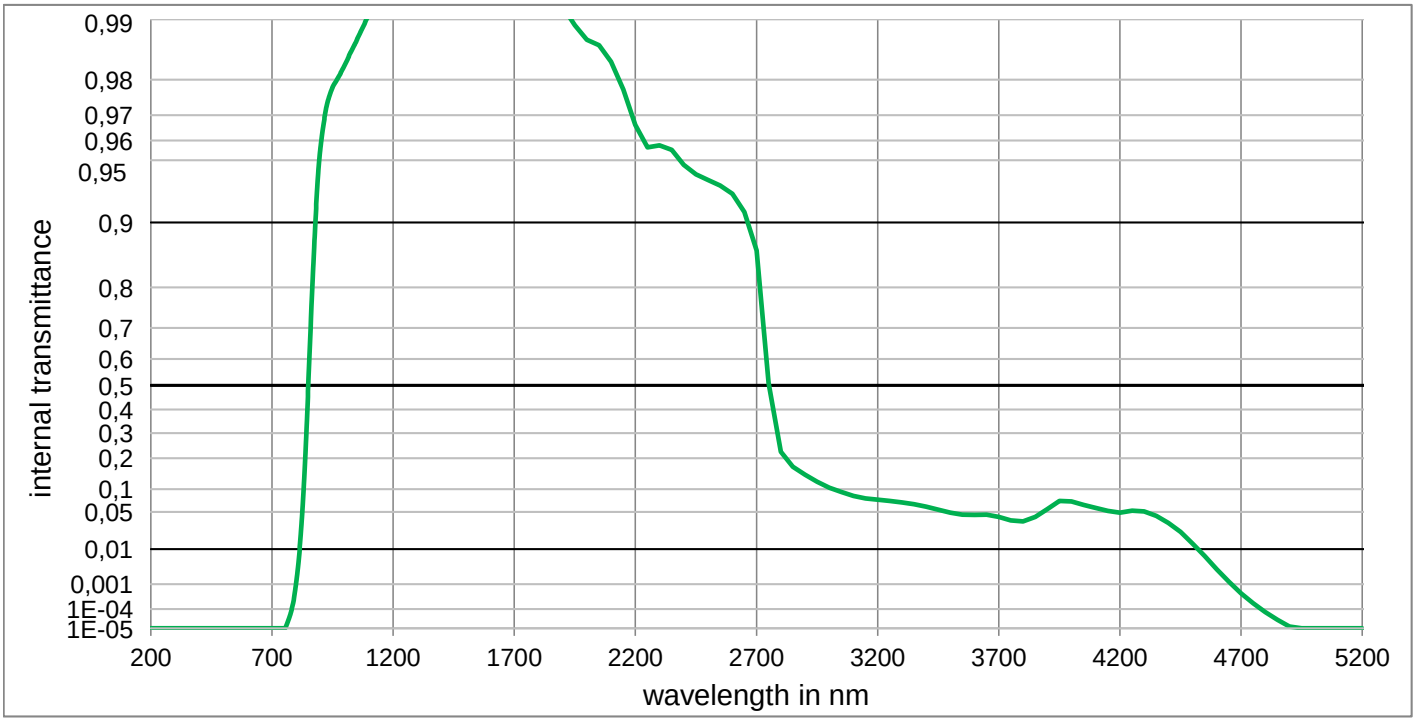
| Notes |
|---|
| |
| Stricking glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## RG850




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 1,156E-03 | 1100 | 9,905E-01 | 2200 | 9,665E-01 | 3700 | 4,170E-02 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 5,250E-03 | 1110 | 9,909E-01 | 2250 | 9,567E-01 | 3750 | 3,687E-02 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 2,363E-02 | 1120 | 9,914E-01 | 2300 | 9,577E-01 | 3800 | 3,540E-02 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 9,140E-02 | 1130 | 9,918E-01 | 2350 | 9,555E-01 | 3850 | 4,188E-02 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 2,610E-01 | 1140 | 9,923E-01 | 2400 | 9,474E-01 | 3900 | 5,486E-02 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 5,003E-01 | 1150 | 9,927E-01 | 2450 | 9,414E-01 | 3950 | 7,151E-02 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 7,037E-01 | 1160 | 9,931E-01 | 2500 | 9,375E-01 | 4000 | 7,070E-02 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 8,376E-01 | 1170 | 9,935E-01 | 2550 | 9,336E-01 | 4050 | 6,328E-02 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 9,053E-01 | 1180 | 9,939E-01 | 2600 | 9,272E-01 | 4100 | 5,719E-02 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 9,399E-01 | 1190 | 9,943E-01 | 2650 | 9,108E-01 | 4150 | 5,179E-02 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 9,565E-01 | 1200 | 9,946E-01 | 2700 | 8,646E-01 | 4200 | 4,878E-02 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 9,651E-01 | 1250 | 9,960E-01 | 2750 | 5,095E-01 | 4250 | 5,219E-02 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 9,706E-01 | 1300 | 9,973E-01 | 2800 | 2,243E-01 | 4300 | 5,097E-02 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 9,743E-01 | 1350 | 9,984E-01 | 2850 | 1,689E-01 | 4350 | 4,352E-02 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 9,765E-01 | 1400 | 9,974E-01 | 2900 | 1,425E-01 | 4400 | 3,343E-02 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | 9,782E-01 | 1450 | 9,984E-01 | 2950 | 1,212E-01 | 4450 | 2,305E-02 |
| 360 | < 1,000E-05 | 660 | < 1,000E-05 | 960 | 9,792E-01 | 1500 | 9,997E-01 | 3000 | 1,043E-01 | 4500 | 1,334E-02 |
| 370 | < 1,000E-05 | 670 | < 1,000E-05 | 970 | 9,802E-01 | 1550 | 9,999E-01 | 3050 | 9,268E-02 | 4550 | 6,780E-03 |
| 380 | < 1,000E-05 | 680 | < 1,000E-05 | 980 | 9,811E-01 | 1600 | 9,998E-01 | 3100 | 8,310E-02 | 4600 | 2,980E-03 |
| 390 | < 1,000E-05 | 690 | < 1,000E-05 | 990 | 9,821E-01 | 1650 | 9,986E-01 | 3150 | 7,685E-02 | 4650 | 1,211E-03 |
| 400 | < 1,000E-05 | 700 | < 1,000E-05 | 1000 | 9,830E-01 | 1700 | 9,968E-01 | 3200 | 7,425E-02 | 4700 | 4,656E-04 |
| 410 | < 1,000E-05 | 710 | < 1,000E-05 | 1010 | 9,840E-01 | 1750 | 9,950E-01 | 3250 | 7,161E-02 | 4750 | 1,803E-04 |
| 420 | < 1,000E-05 | 720 | < 1,000E-05 | 1020 | 9,850E-01 | 1800 | 9,933E-01 | 3300 | 6,837E-02 | 4800 | 7,194E-05 |
| 430 | < 1,000E-05 | 730 | < 1,000E-05 | 1030 | 9,858E-01 | 1850 | 9,922E-01 | 3350 | 6,445E-02 | 4850 | 2,958E-05 |
| 440 | < 1,000E-05 | 740 | < 1,000E-05 | 1040 | 9,865E-01 | 1900 | 9,914E-01 | 3400 | 5,946E-02 | 4900 | 1,282E-05 |
| 450 | < 1,000E-05 | 750 | < 1,000E-05 | 1050 | 9,873E-01 | 1950 | 9,893E-01 | 3450 | 5,405E-02 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | 1,507E-05 | 1060 | 9,880E-01 | 2000 | 9,874E-01 | 3500 | 4,881E-02 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | 3,444E-05 | 1070 | 9,887E-01 | 2050 | 9,865E-01 | 3550 | 4,544E-02 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | 8,542E-05 | 1080 | 9,894E-01 | 2100 | 9,837E-01 | 3600 | 4,510E-02 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 2,412E-04 | 1090 | 9,900E-01 | 2150 | 9,776E-01 | 3650 | 4,534E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## RG905

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,921 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | | ≤ | 0,002 |
| $\tau_i$ (490 nm) | | ≤ | 0,08 |
| $\tau_i$ (645 nm) | | ≤ | 0,002 |
| $\tau_i$ (900 nm) | | ≥ | 0,96 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,51 |
| $n_d$ (587,6 nm) | | = | 1,51 |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | 0,6150 | | |
| $B_2$ | 0,6285 | | |
| $B_3$ | 13,7990 | | |
| $C_1$ | 1,035E-02 | µm² | |
| $C_2$ | 1,0302E-02 | µm² | |
| $C_3$ | 1939,581 | µm² | |
| **Internal quality** | | | |
| Bubble class | - | | |

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

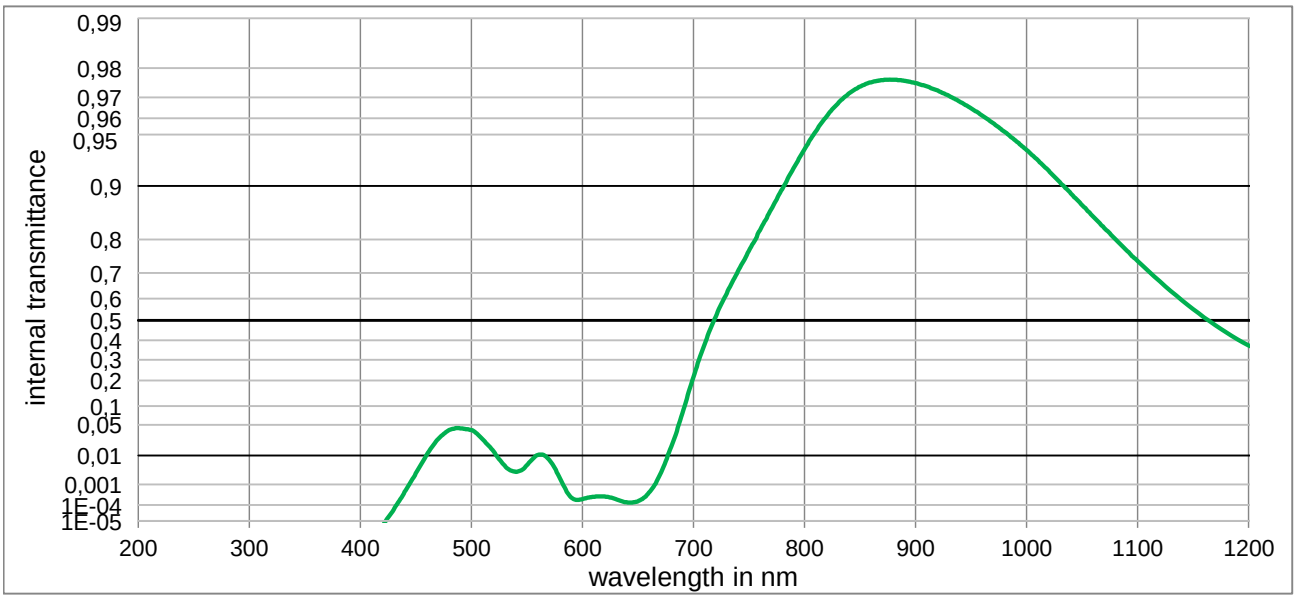
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 481 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 8,8 |
| $\alpha_{(20°C/300°C)}$ | | = | 10,1 |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 1.0 |
| | AR class | = | 1.0 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

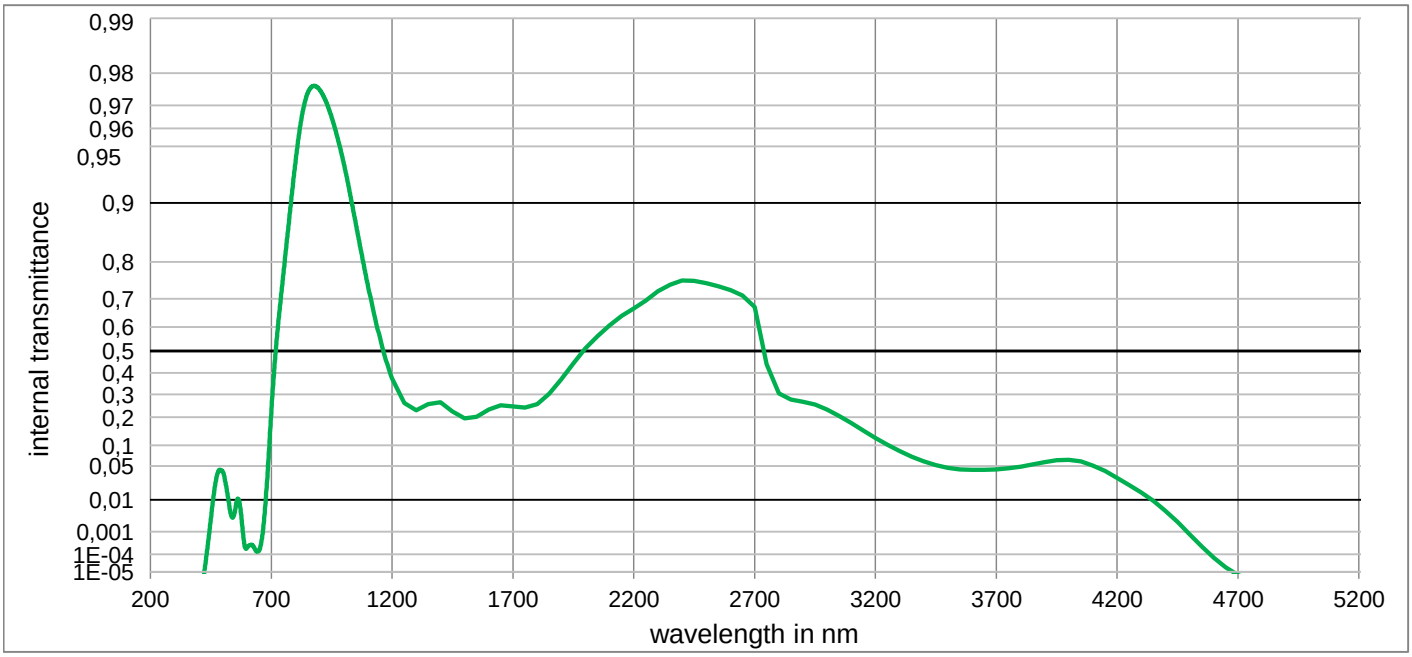
| Notes |
|---|
| |
| Bandpass filter / Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## RG905




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

| λ /nm | | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < | 1,000E-05 | 500 | 3,976E-02 | 800 | 9,390E-01 | 1100 | 7,396E-01 | 2200 | 6,679E-01 | 3700 | 4,391E-02 |
| 210 | < | 1,000E-05 | 510 | 2,571E-02 | 810 | 9,520E-01 | 1110 | 7,055E-01 | 2250 | 6,951E-01 | 3750 | 4,577E-02 |
| 220 | < | 1,000E-05 | 520 | 1,286E-02 | 820 | 9,611E-01 | 1120 | 6,691E-01 | 2300 | 7,234E-01 | 3800 | 4,874E-02 |
| 230 | < | 1,000E-05 | 530 | 4,884E-03 | 830 | 9,674E-01 | 1130 | 6,316E-01 | 2350 | 7,420E-01 | 3850 | 5,293E-02 |
| 240 | < | 1,000E-05 | 540 | 3,090E-03 | 840 | 9,715E-01 | 1140 | 5,930E-01 | 2400 | 7,535E-01 | 3900 | 5,778E-02 |
| 250 | < | 1,000E-05 | 550 | 5,037E-03 | 850 | 9,741E-01 | 1150 | 5,546E-01 | 2450 | 7,528E-01 | 3950 | 6,183E-02 |
| 260 | < | 1,000E-05 | 560 | 1,043E-02 | 860 | 9,757E-01 | 1160 | 5,149E-01 | 2500 | 7,462E-01 | 4000 | 6,292E-02 |
| 270 | < | 1,000E-05 | 570 | 7,584E-03 | 870 | 9,764E-01 | 1170 | 4,769E-01 | 2550 | 7,382E-01 | 4050 | 5,930E-02 |
| 280 | < | 1,000E-05 | 580 | 1,695E-03 | 880 | 9,765E-01 | 1180 | 4,398E-01 | 2600 | 7,270E-01 | 4100 | 5,118E-02 |
| 290 | < | 1,000E-05 | 590 | 2,482E-04 | 890 | 9,762E-01 | 1190 | 4,054E-01 | 2650 | 7,110E-01 | 4150 | 4,086E-02 |
| 300 | < | 1,000E-05 | 600 | 2,072E-04 | 900 | 9,754E-01 | 1200 | 3,741E-01 | 2700 | 6,734E-01 | 4200 | 3,081E-02 |
| 310 | < | 1,000E-05 | 610 | 2,717E-04 | 910 | 9,742E-01 | 1250 | 2,610E-01 | 2750 | 4,409E-01 | 4250 | 2,192E-02 |
| 320 | < | 1,000E-05 | 620 | 2,813E-04 | 920 | 9,727E-01 | 1300 | 2,294E-01 | 2800 | 3,043E-01 | 4300 | 1,498E-02 |
| 330 | < | 1,000E-05 | 630 | 2,067E-04 | 930 | 9,706E-01 | 1350 | 2,554E-01 | 2850 | 2,767E-01 | 4350 | 9,436E-03 |
| 340 | < | 1,000E-05 | 640 | 1,399E-04 | 940 | 9,682E-01 | 1400 | 2,637E-01 | 2900 | 2,666E-01 | 4400 | 5,022E-03 |
| 350 | < | 1,000E-05 | 650 | 1,604E-04 | 950 | 9,651E-01 | 1450 | 2,237E-01 | 2950 | 2,536E-01 | 4450 | 2,197E-03 |
| 360 | < | 1,000E-05 | 660 | 4,276E-04 | 960 | 9,615E-01 | 1500 | 1,946E-01 | 3000 | 2,324E-01 | 4500 | 7,882E-04 |
| 370 | < | 1,000E-05 | 670 | 2,431E-03 | 970 | 9,572E-01 | 1550 | 2,015E-01 | 3050 | 2,053E-01 | 4550 | 2,409E-04 |
| 380 | < | 1,000E-05 | 680 | 1,696E-02 | 980 | 9,520E-01 | 1600 | 2,316E-01 | 3100 | 1,763E-01 | 4600 | 6,732E-05 |
| 390 | < | 1,000E-05 | 690 | 7,804E-02 | 990 | 9,458E-01 | 1650 | 2,511E-01 | 3150 | 1,484E-01 | 4650 | 1,888E-05 |
| 400 | < | 1,000E-05 | 700 | 2,159E-01 | 1000 | 9,384E-01 | 1700 | 2,453E-01 | 3200 | 1,232E-01 | 4700 | < 1,000E-05 |
| 410 | < | 1,000E-05 | 710 | 3,800E-01 | 1010 | 9,293E-01 | 1750 | 2,398E-01 | 3250 | 1,019E-01 | 4750 | < 1,000E-05 |
| 420 | < | 1,000E-05 | 720 | 5,179E-01 | 1020 | 9,183E-01 | 1800 | 2,556E-01 | 3300 | 8,420E-02 | 4800 | < 1,000E-05 |
| 430 | | 5,472E-05 | 730 | 6,230E-01 | 1030 | 9,046E-01 | 1850 | 3,022E-01 | 3350 | 7,017E-02 | 4850 | < 1,000E-05 |
| 440 | | 4,661E-04 | 740 | 7,044E-01 | 1040 | 8,896E-01 | 1900 | 3,686E-01 | 3400 | 5,923E-02 | 4900 | < 1,000E-05 |
| 450 | | 2,734E-03 | 750 | 7,693E-01 | 1050 | 8,716E-01 | 1950 | 4,445E-01 | 3450 | 5,152E-02 | 4950 | < 1,000E-05 |
| 460 | | 1,065E-02 | 760 | 8,221E-01 | 1060 | 8,510E-01 | 2000 | 5,108E-01 | 3500 | 4,635E-02 | 5000 | < 1,000E-05 |
| 470 | | 2,565E-02 | 770 | 8,634E-01 | 1070 | 8,273E-01 | 2050 | 5,626E-01 | 3550 | 4,383E-02 | 5050 | < 1,000E-05 |
| 480 | | 3,962E-02 | 780 | 8,957E-01 | 1080 | 8,012E-01 | 2100 | 6,059E-01 | 3600 | 4,281E-02 | 5100 | < 1,000E-05 |
| 490 | | 4,315E-02 | 790 | 9,207E-01 | 1090 | 7,714E-01 | 2150 | 6,425E-01 | 3650 | 4,292E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## RG1000

| Optical properties | |
|---|---|
| **Reflection factor** | |
| $P_d$ | = 0,913 |
| **Spectral values guaranteed (d = 3 mm)** | |
| $\lambda_c$ ($\tau_i$ = 0,5) | = 1000 nm ± 6 nm |
| $\lambda_s$ ($\tau_{i,U}$ = 1E-05) | = 730 nm |
| $\lambda_p$ ($\tau_{i,L}$ = 0,90) | = 1300 nm |
| **Refractive indices** | |
| $n_d$ ( 587,6 nm) | = 1,54 |
| $n_s$ ( 852 nm) | = 1,53 |
| $n_t$ (1014 nm) | = 1,53 |
| **Sellmeier coefficients** | |
| valid from 440 nm to 1550 nm | |
| $B_1$ = | 0,8970 |
| $B_2$ = | 0,4353 |
| $B_3$ = | 1,1960 |
| $C_1$ = | 1,087E-02 µm² |
| $C_2$ = | 1,1835E-02 µm² |
| $C_3$ = | 142,345 µm² |
| **Internal quality** | |
| Bubble class | 3 |

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

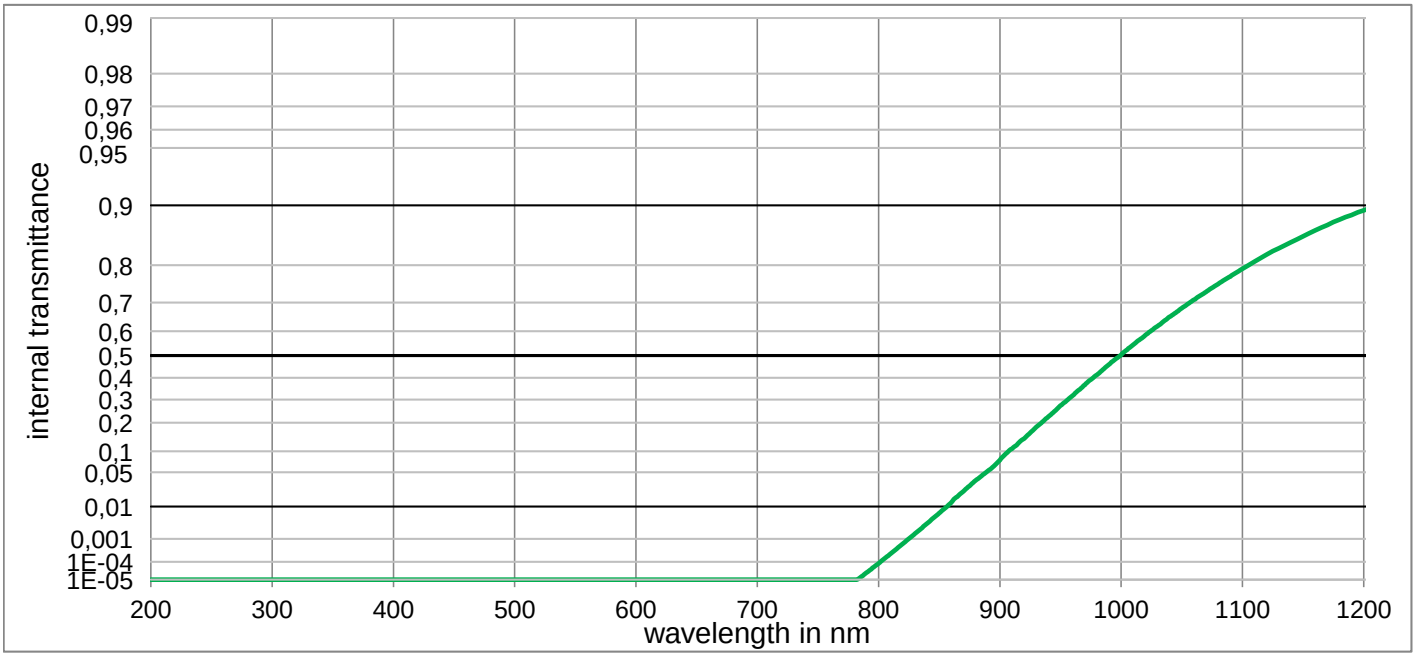
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = 476 °C | |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = 9,0 | |
| $\alpha_{(20°C/300°C)}$ | = 10,3 | |
| **Temperature coefficient** | | |
| Tk | = 0,41 | nm/K |

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 0 |
| SR class | = 1 |
| AR class | = 1 |
| **Resistance against humidity** | |
| Robust glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

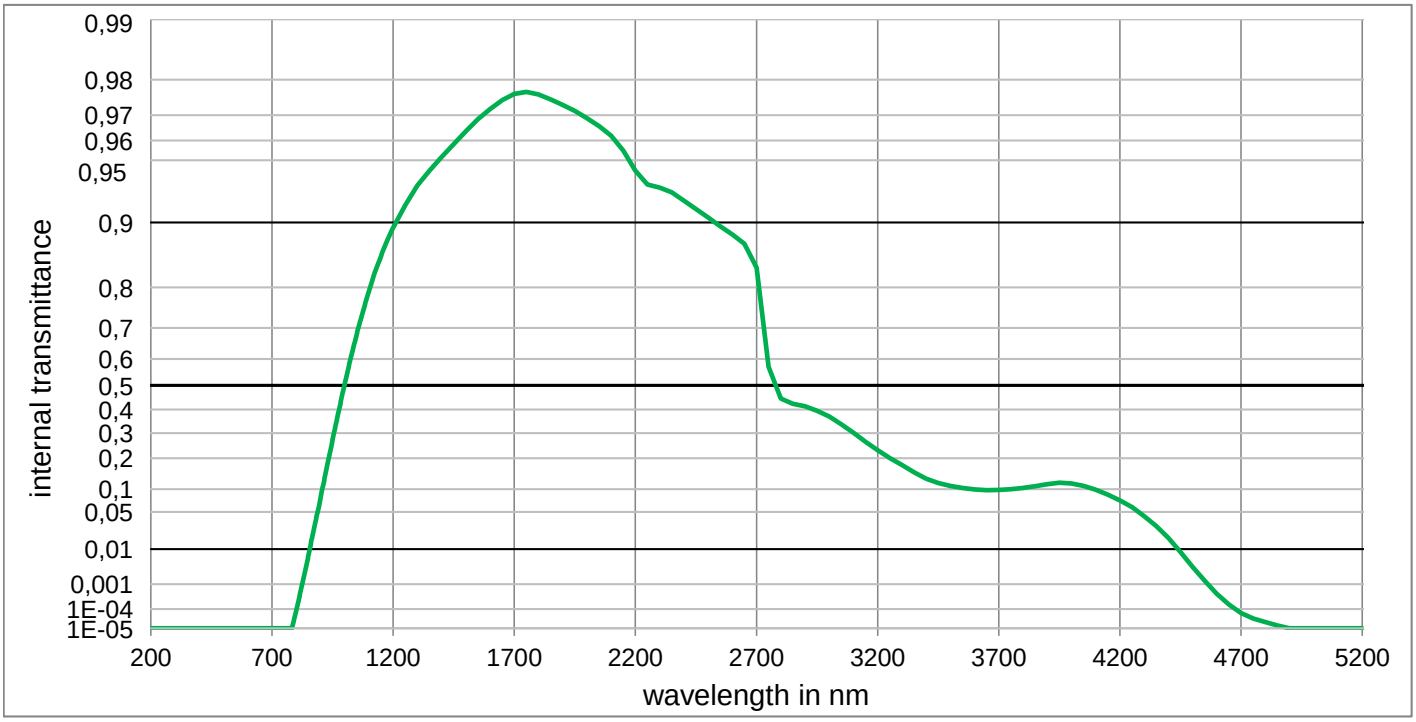
| Notes |
|---|
| |
| Ionically colored glass |
| Longpass filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## RG1000




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | < 1,000E-05 | 800 | 8,394E-05 | 1100 | 7,917E-01 | 2200 | 9,439E-01 | 3700 | 9,800E-02 |
| 210 | < 1,0E-05 | 510 | < 1,000E-05 | 810 | 2,455E-04 | 1110 | 8,080E-01 | 2250 | 9,342E-01 | 3750 | 1,002E-01 |
| 220 | < 1,0E-05 | 520 | < 1,000E-05 | 820 | 6,502E-04 | 1120 | 8,226E-01 | 2300 | 9,320E-01 | 3800 | 1,036E-01 |
| 230 | < 1,0E-05 | 530 | < 1,000E-05 | 830 | 1,551E-03 | 1130 | 8,350E-01 | 2350 | 9,284E-01 | 3850 | 1,080E-01 |
| 240 | < 1,0E-05 | 540 | < 1,000E-05 | 840 | 3,371E-03 | 1140 | 8,459E-01 | 2400 | 9,216E-01 | 3900 | 1,136E-01 |
| 250 | < 1,0E-05 | 550 | < 1,000E-05 | 850 | 6,757E-03 | 1150 | 8,561E-01 | 2450 | 9,138E-01 | 3950 | 1,179E-01 |
| 260 | < 1,0E-05 | 560 | < 1,000E-05 | 860 | 1,254E-02 | 1160 | 8,656E-01 | 2500 | 9,054E-01 | 4000 | 1,161E-01 |
| 270 | < 1,0E-05 | 570 | < 1,000E-05 | 870 | 2,229E-02 | 1170 | 8,739E-01 | 2550 | 8,959E-01 | 4050 | 1,089E-01 |
| 280 | < 1,0E-05 | 580 | < 1,000E-05 | 880 | 3,617E-02 | 1180 | 8,816E-01 | 2600 | 8,861E-01 | 4100 | 9,840E-02 |
| 290 | < 1,0E-05 | 590 | < 1,000E-05 | 890 | 5,218E-02 | 1190 | 8,879E-01 | 2650 | 8,740E-01 | 4150 | 8,574E-02 |
| 300 | < 1,0E-05 | 600 | < 1,000E-05 | 900 | 7,670E-02 | 1200 | 8,940E-01 | 2700 | 8,370E-01 | 4200 | 7,245E-02 |
| 310 | < 1,0E-05 | 610 | < 1,000E-05 | 910 | 1,073E-01 | 1250 | 9,176E-01 | 2750 | 5,716E-01 | 4250 | 5,855E-02 |
| 320 | < 1,000E-05 | 620 | < 1,000E-05 | 920 | 1,407E-01 | 1300 | 9,335E-01 | 2800 | 4,462E-01 | 4300 | 4,286E-02 |
| 330 | < 1,000E-05 | 630 | < 1,000E-05 | 930 | 1,822E-01 | 1350 | 9,438E-01 | 2850 | 4,240E-01 | 4350 | 2,926E-02 |
| 340 | < 1,000E-05 | 640 | < 1,000E-05 | 940 | 2,248E-01 | 1400 | 9,518E-01 | 2900 | 4,138E-01 | 4400 | 1,762E-02 |
| 350 | < 1,000E-05 | 650 | < 1,000E-05 | 950 | 2,726E-01 | 1450 | 9,583E-01 | 2950 | 3,942E-01 | 4450 | 8,530E-03 |
| 360 | < 1,000E-05 | 660 | < 1,000E-05 | 960 | 3,177E-01 | 1500 | 9,640E-01 | 3000 | 3,704E-01 | 4500 | 3,477E-03 |
| 370 | < 1,000E-05 | 670 | < 1,000E-05 | 970 | 3,676E-01 | 1550 | 9,687E-01 | 3050 | 3,373E-01 | 4550 | 1,300E-03 |
| 380 | < 1,000E-05 | 680 | < 1,000E-05 | 980 | 4,135E-01 | 1600 | 9,720E-01 | 3100 | 3,015E-01 | 4600 | 4,406E-04 |
| 390 | < 1,000E-05 | 690 | < 1,000E-05 | 990 | 4,614E-01 | 1650 | 9,747E-01 | 3150 | 2,644E-01 | 4650 | 1,603E-04 |
| 400 | < 1,000E-05 | 700 | < 1,000E-05 | 1000 | 5,029E-01 | 1700 | 9,764E-01 | 3200 | 2,303E-01 | 4700 | 6,397E-05 |
| 410 | < 1,000E-05 | 710 | < 1,000E-05 | 1010 | 5,464E-01 | 1750 | 9,770E-01 | 3250 | 2,013E-01 | 4750 | 3,404E-05 |
| 420 | < 1,000E-05 | 720 | < 1,000E-05 | 1020 | 5,848E-01 | 1800 | 9,763E-01 | 3300 | 1,753E-01 | 4800 | 2,249E-05 |
| 430 | < 1,000E-05 | 730 | < 1,000E-05 | 1030 | 6,192E-01 | 1850 | 9,750E-01 | 3350 | 1,507E-01 | 4850 | 1,445E-05 |
| 440 | < 1,000E-05 | 740 | < 1,000E-05 | 1040 | 6,527E-01 | 1900 | 9,733E-01 | 3400 | 1,302E-01 | 4900 | < 1,000E-05 |
| 450 | < 1,000E-05 | 750 | < 1,000E-05 | 1050 | 6,821E-01 | 1950 | 9,715E-01 | 3450 | 1,174E-01 | 4950 | < 1,000E-05 |
| 460 | < 1,000E-05 | 760 | < 1,000E-05 | 1060 | 7,085E-01 | 2000 | 9,690E-01 | 3500 | 1,088E-01 | 5000 | < 1,000E-05 |
| 470 | < 1,000E-05 | 770 | < 1,000E-05 | 1070 | 7,320E-01 | 2050 | 9,660E-01 | 3550 | 1,030E-01 | 5050 | < 1,000E-05 |
| 480 | < 1,000E-05 | 780 | < 1,000E-05 | 1080 | 7,538E-01 | 2100 | 9,622E-01 | 3600 | 9,915E-02 | 5100 | < 1,000E-05 |
| 490 | < 1,000E-05 | 790 | 2,575E-05 | 1090 | 7,734E-01 | 2150 | 9,551E-01 | 3650 | 9,763E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## S7000

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

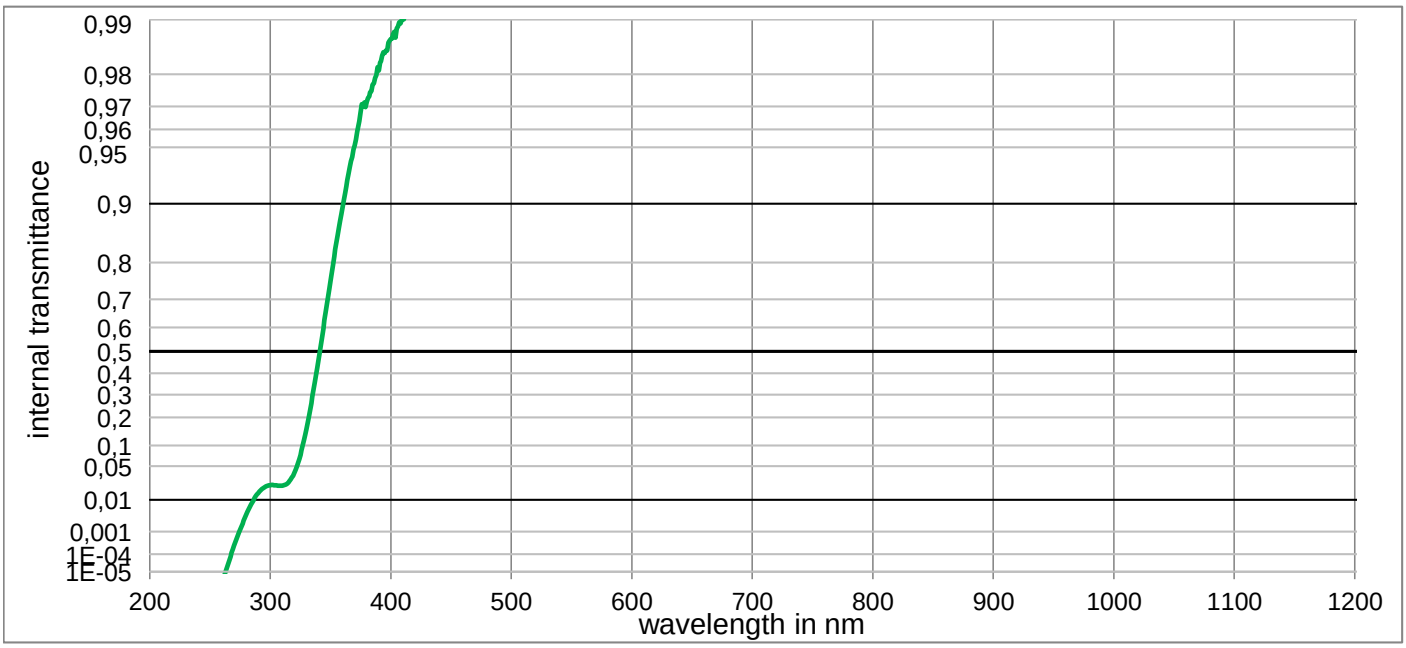
| Mechanical properties | |
|---|---|
| **Reference thickness** | |
| d | = 2,00 mm |
| **Density** | |
| ρ | = 2,83 g/cm³ |
| **Knoop hardness** | |
| $HK_{[0.1/20]}$ | |

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

| Chemical properties | |
|---|---|
| **Chemical resistance** | |
| FR class | = 1 |
| SR class | = 1.2 |
| AR class | = 1.0 |
| **Resistance against humidity** | |
| Resistant glass | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | |

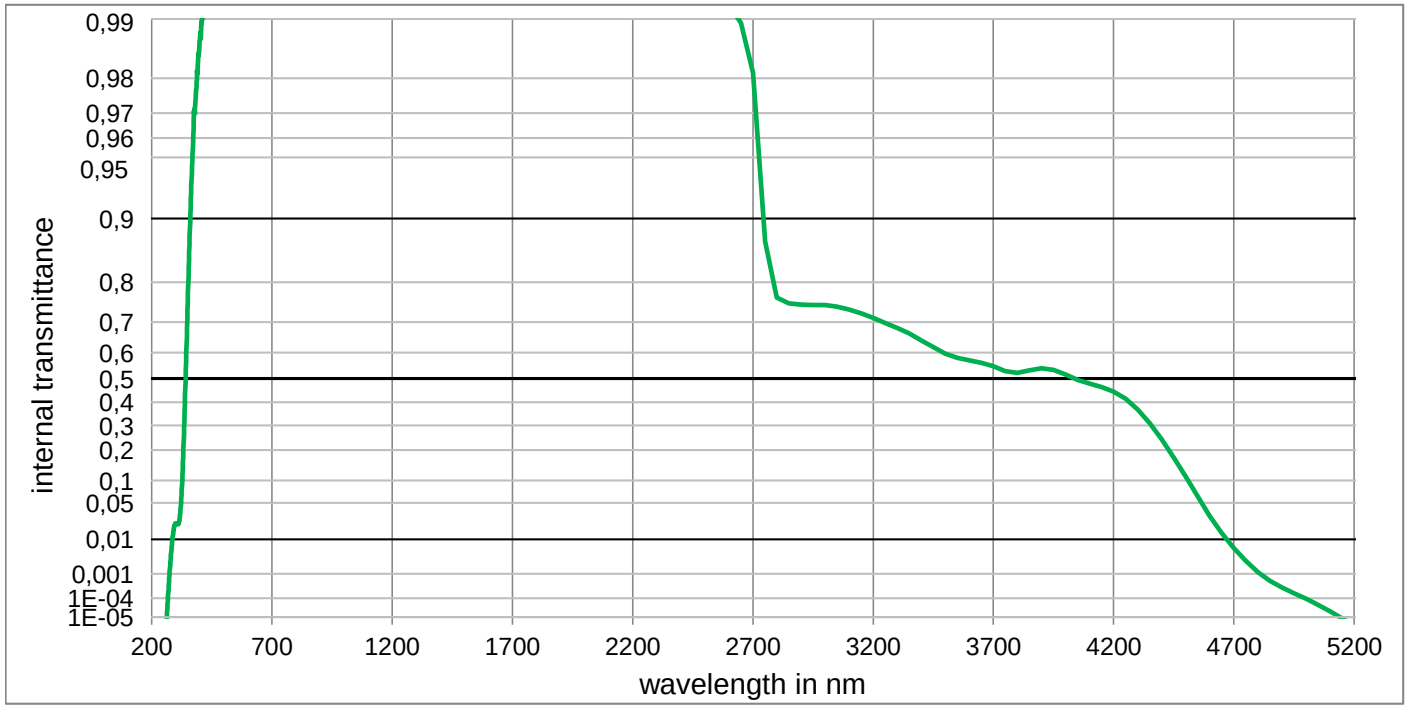
| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | 0,313 | 0,313 | 0,313 |
| | y | 0,329 | 0,329 | 0,330 |
| | Y | 90,8 | 90,7 | 90,7 |
| | $\lambda_d$ | 574 nm | 574 nm | 575 nm |
| | $P_e$ | 0,001 | 0,002 | 0,004 |
| Illuminant A | x | 0,448 | 0,448 | 0,448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

| Notes |
|---|
| Ionically colored glass |
| Cerium doped |
| DIN 58131 |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## S7000




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,965E-01 | 800 | 9,939E-01 | 1100 | 9,973E-01 | 2200 | 9,949E-01 | 3700 | 5,490E-01 |
| 210 | < 1,0E-05 | 510 | 9,972E-01 | 810 | 9,958E-01 | 1110 | 9,972E-01 | 2250 | 9,915E-01 | 3750 | 5,293E-01 |
| 220 | < 1,0E-05 | 520 | 9,979E-01 | 820 | 9,942E-01 | 1120 | 9,975E-01 | 2300 | 9,923E-01 | 3800 | 5,223E-01 |
| 230 | < 1,0E-05 | 530 | 9,982E-01 | 830 | 9,951E-01 | 1130 | 9,976E-01 | 2350 | 9,915E-01 | 3850 | 5,329E-01 |
| 240 | < 1,0E-05 | 540 | 9,989E-01 | 840 | 9,956E-01 | 1140 | 9,974E-01 | 2400 | 9,995E-01 | 3900 | 5,403E-01 |
| 250 | < 1,0E-05 | 550 | 9,994E-01 | 850 | 9,939E-01 | 1150 | 9,975E-01 | 2450 | 9,976E-01 | 3950 | 5,346E-01 |
| 260 | < 1,0E-05 | 560 | 9,919E-01 | 860 | 9,940E-01 | 1160 | 9,975E-01 | 2500 | 9,945E-01 | 4000 | 5,156E-01 |
| 270 | 2,5E-04 | 570 | 9,997E-01 | 870 | 9,964E-01 | 1170 | 9,976E-01 | 2550 | 9,931E-01 | 4050 | 4,951E-01 |
| 280 | 3,8E-03 | 580 | 9,995E-01 | 880 | 9,970E-01 | 1180 | 9,975E-01 | 2600 | 9,915E-01 | 4100 | 4,796E-01 |
| 290 | 1,5E-02 | 590 | 9,998E-01 | 890 | 9,965E-01 | 1190 | 9,978E-01 | 2650 | 9,895E-01 | 4150 | 4,652E-01 |
| 300 | 2,2E-02 | 600 | 9,916E-01 | 900 | 9,965E-01 | 1200 | 9,976E-01 | 2700 | 9,813E-01 | 4200 | 4,449E-01 |
| 310 | 2,1E-02 | 610 | 9,917E-01 | 910 | 9,967E-01 | 1250 | 9,977E-01 | 2750 | 8,713E-01 | 4250 | 4,150E-01 |
| 320 | 3,831E-02 | 620 | 9,915E-01 | 920 | 9,973E-01 | 1300 | 9,977E-01 | 2800 | 7,654E-01 | 4300 | 3,683E-01 |
| 330 | 1,542E-01 | 630 | 9,920E-01 | 930 | 9,970E-01 | 1350 | 9,988E-01 | 2850 | 7,508E-01 | 4350 | 3,098E-01 |
| 340 | 4,615E-01 | 640 | 9,923E-01 | 940 | 9,970E-01 | 1400 | 9,980E-01 | 2900 | 7,483E-01 | 4400 | 2,423E-01 |
| 350 | 7,547E-01 | 650 | 9,927E-01 | 950 | 9,973E-01 | 1450 | 9,978E-01 | 2950 | 7,474E-01 | 4450 | 1,724E-01 |
| 360 | 8,962E-01 | 660 | 9,930E-01 | 960 | 9,970E-01 | 1500 | 9,983E-01 | 3000 | 7,466E-01 | 4500 | 1,097E-01 |
| 370 | 9,511E-01 | 670 | 9,926E-01 | 970 | 9,969E-01 | 1550 | 9,983E-01 | 3050 | 7,431E-01 | 4550 | 6,139E-02 |
| 380 | 9,717E-01 | 680 | 9,933E-01 | 980 | 9,965E-01 | 1600 | 9,984E-01 | 3100 | 7,354E-01 | 4600 | 3,030E-02 |
| 390 | 9,810E-01 | 690 | 9,933E-01 | 990 | 9,968E-01 | 1650 | 9,983E-01 | 3150 | 7,247E-01 | 4650 | 1,385E-02 |
| 400 | 9,872E-01 | 700 | 9,933E-01 | 1000 | 9,968E-01 | 1700 | 9,978E-01 | 3200 | 7,118E-01 | 4700 | 6,063E-03 |
| 410 | 9,906E-01 | 710 | 9,923E-01 | 1010 | 9,970E-01 | 1750 | 9,977E-01 | 3250 | 6,980E-01 | 4750 | 2,611E-03 |
| 420 | 9,929E-01 | 720 | 9,933E-01 | 1020 | 9,971E-01 | 1800 | 9,975E-01 | 3300 | 6,829E-01 | 4800 | 1,160E-03 |
| 430 | 9,933E-01 | 730 | 9,942E-01 | 1030 | 9,973E-01 | 1850 | 9,969E-01 | 3350 | 6,653E-01 | 4850 | 5,507E-04 |
| 440 | 9,946E-01 | 740 | 9,930E-01 | 1040 | 9,974E-01 | 1900 | 9,969E-01 | 3400 | 6,429E-01 | 4900 | 2,942E-04 |
| 450 | 9,947E-01 | 750 | 9,944E-01 | 1050 | 9,972E-01 | 1950 | 9,969E-01 | 3450 | 6,193E-01 | 4950 | 1,688E-04 |
| 460 | 9,951E-01 | 760 | 9,922E-01 | 1060 | 9,972E-01 | 2000 | 9,981E-01 | 3500 | 5,955E-01 | 5000 | 9,375E-05 |
| 470 | 9,968E-01 | 770 | 9,949E-01 | 1070 | 9,971E-01 | 2050 | 9,977E-01 | 3550 | 5,800E-01 | 5050 | 4,751E-05 |
| 480 | 9,978E-01 | 780 | 9,933E-01 | 1080 | 9,971E-01 | 2100 | 9,955E-01 | 3600 | 5,717E-01 | 5100 | 2,188E-05 |
| 490 | 9,968E-01 | 790 | 9,928E-01 | 1090 | 9,973E-01 | 2150 | 9,949E-01 | 3650 | 5,619E-01 | 5150 | < 1,000E-05 |

# Data Sheet

SCHOTT

## KG1

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,920 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | | ≥ | 0,89 |
| $\tau_i$ (500 nm) | | ≥ | 0,92 |
| $\tau_i$ (600 nm) | | ≥ | 0,88 |
| $\tau_i$ (700 nm) | | ≤ | 0,68 |
| $\tau_i$ (800 nm) | | ≤ | 0,33 |
| $\tau_i$ (900 nm) | | ≤ | 0,1 |
| $\tau_i$ (1060 nm) | | ≤ | 0,02 |
| $\tau_i$ (2200 nm) | | ≤ | 0,06 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,51 |
| $n_d$ (587,6 nm) | | = | 1,51 |
| | | | |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | 0,3376 | | |
| $B_2$ | 0,9188 | | |
| $B_3$ | 1,8816 | | |
| $C_1$ | 3,461E-03 | µm² | |
| $C_2$ | 9,9076E-03 | µm² | |
| $C_3$ | 181,405 | µm² | |
| **Internal quality** | | | |
| Bubble class | 3 | | |

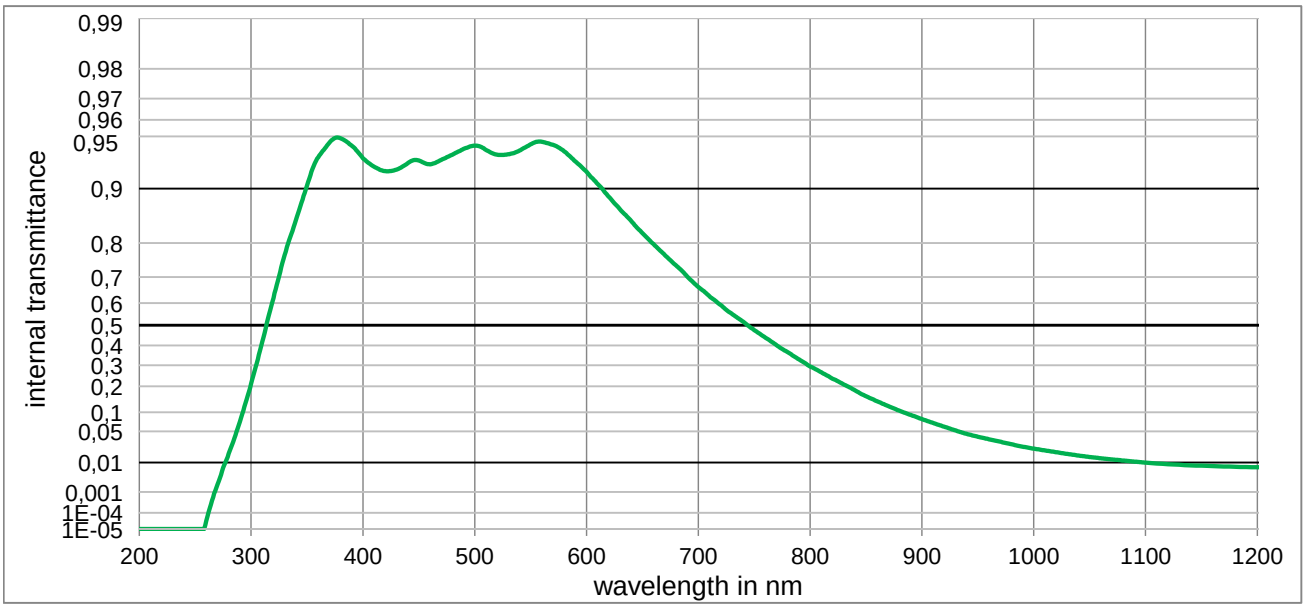
| Mechanical properties | | | |
|---|---|---|---|
| **Reference thickness** | | | |
| | d | = | 2,00 mm |
| **Density** | | | |
| | ρ | = | 2,52 g/cm³ |
| **Knoop hardness** | | | |
| HK[0.1/20] | | = | 456 |

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

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 2 |
| | AR class | = | 3 |
| **Resistance against humidity** | | | |
| Delicate glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

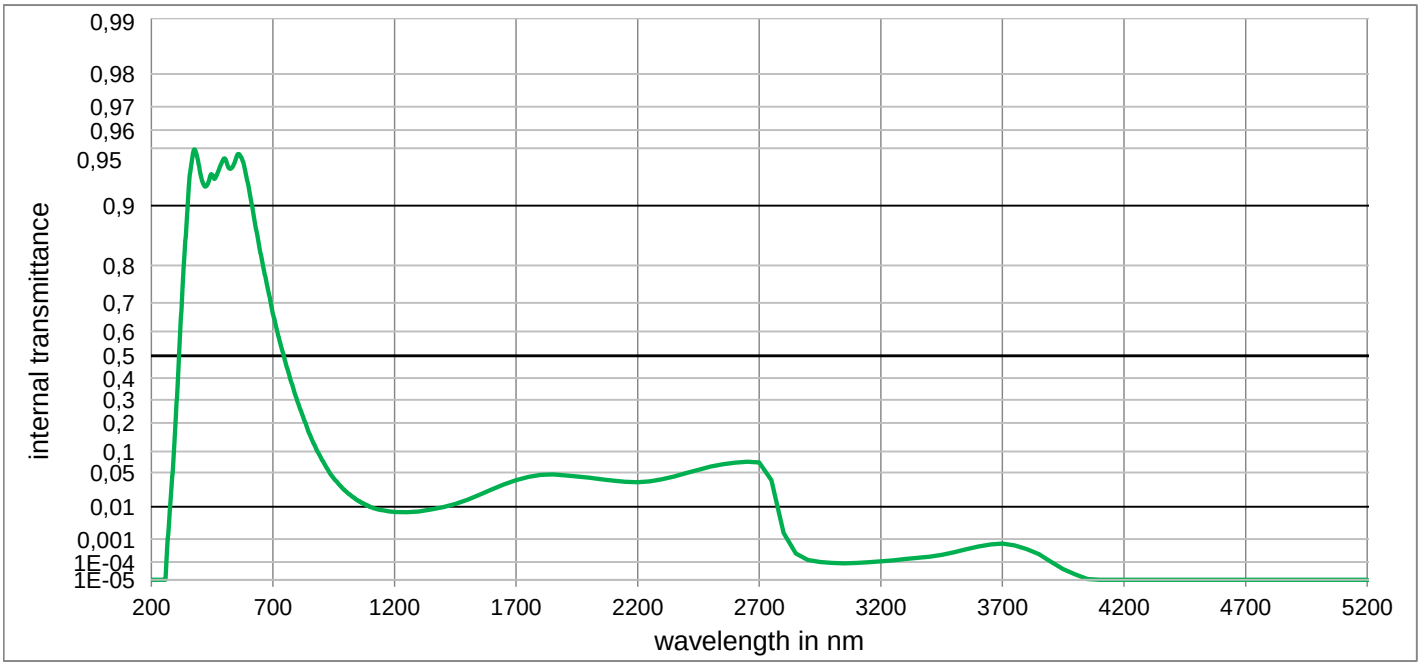
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,311 | 0,309 | 0,307 |
| | y | 0,330 | 0,331 | 0,332 |
| | Y | 88,7 | 85,6 | 82,6 |
| | $\lambda_d$ | 497 nm | 497 nm | 498 nm |
| | $P_e$ | 0,006 | 0,013 | 0,018 |
| Illuminant A | x | 0,444 | 0,441 | 0,438 |
| | y | 0,409 | 0,411 | 0,413 |
| | Y | 88,4 | 84,9 | 81,6 |
| | $\lambda_d$ | 505 nm | 505 nm | 505 nm |
| | $P_e$ | 0,007 | 0,014 | 0,021 |

| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Shortpass filter |
| |
| Heat protection filter |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## KG1




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,434E-01 | 800 | 2,936E-01 | 1100 | 9,948E-03 | 2200 | 3,377E-02 | 3700 | 6,632E-04 |
| 210 | < 1,0E-05 | 510 | 9,402E-01 | 810 | 2,650E-01 | 1110 | 9,410E-03 | 2250 | 3,523E-02 | 3750 | 5,698E-04 |
| 220 | < 1,0E-05 | 520 | 9,362E-01 | 820 | 2,349E-01 | 1120 | 8,986E-03 | 2300 | 3,829E-02 | 3800 | 3,991E-04 |
| 230 | < 1,0E-05 | 530 | 9,364E-01 | 830 | 2,082E-01 | 1130 | 8,642E-03 | 2350 | 4,292E-02 | 3850 | 2,350E-04 |
| 240 | < 1,0E-05 | 540 | 9,395E-01 | 840 | 1,824E-01 | 1140 | 8,360E-03 | 2400 | 4,886E-02 | 3900 | 1,033E-04 |
| 250 | < 1,0E-05 | 550 | 9,444E-01 | 850 | 1,581E-01 | 1150 | 8,157E-03 | 2450 | 5,536E-02 | 3950 | 4,236E-05 |
| 260 | 3,5E-05 | 560 | 9,463E-01 | 860 | 1,377E-01 | 1160 | 7,950E-03 | 2500 | 6,181E-02 | 4000 | 2,104E-05 |
| 270 | 2,0E-03 | 570 | 9,440E-01 | 870 | 1,206E-01 | 1170 | 7,750E-03 | 2550 | 6,692E-02 | 4050 | 1,117E-05 |
| 280 | 1,7E-02 | 580 | 9,389E-01 | 880 | 1,047E-01 | 1180 | 7,580E-03 | 2600 | 7,069E-02 | 4100 | < 1,000E-05 |
| 290 | 7,3E-02 | 590 | 9,302E-01 | 890 | 9,150E-02 | 1190 | 7,453E-03 | 2650 | 7,279E-02 | 4150 | < 1,000E-05 |
| 300 | 2,1E-01 | 600 | 9,199E-01 | 900 | 7,971E-02 | 1200 | 7,350E-03 | 2700 | 7,150E-02 | 4200 | < 1,000E-05 |
| 310 | 4,2E-01 | 610 | 9,060E-01 | 910 | 6,939E-02 | 1250 | 7,200E-03 | 2750 | 3,692E-02 | 4250 | < 1,000E-05 |
| 320 | 6,222E-01 | 620 | 8,887E-01 | 920 | 6,017E-02 | 1300 | 7,570E-03 | 2800 | 1,650E-03 | 4300 | < 1,000E-05 |
| 330 | 7,690E-01 | 630 | 8,693E-01 | 930 | 5,187E-02 | 1350 | 8,490E-03 | 2850 | 2,541E-04 | 4350 | < 1,000E-05 |
| 340 | 8,500E-01 | 640 | 8,481E-01 | 940 | 4,499E-02 | 1400 | 9,840E-03 | 2900 | 1,282E-04 | 4400 | < 1,000E-05 |
| 350 | 9,040E-01 | 650 | 8,230E-01 | 950 | 3,971E-02 | 1450 | 1,182E-02 | 2950 | 9,931E-05 | 4450 | < 1,000E-05 |
| 360 | 9,340E-01 | 660 | 7,970E-01 | 960 | 3,543E-02 | 1500 | 1,472E-02 | 3000 | 8,892E-05 | 4500 | < 1,000E-05 |
| 370 | 9,456E-01 | 670 | 7,690E-01 | 970 | 3,157E-02 | 1550 | 1,909E-02 | 3050 | 8,612E-05 | 4550 | < 1,000E-05 |
| 380 | 9,487E-01 | 680 | 7,380E-01 | 980 | 2,790E-02 | 1600 | 2,463E-02 | 3100 | 9,044E-05 | 4600 | < 1,000E-05 |
| 390 | 9,433E-01 | 690 | 7,020E-01 | 990 | 2,477E-02 | 1650 | 3,097E-02 | 3150 | 9,750E-05 | 4650 | < 1,000E-05 |
| 400 | 9,330E-01 | 700 | 6,640E-01 | 1000 | 2,230E-02 | 1700 | 3,707E-02 | 3200 | 1,074E-04 | 4700 | < 1,000E-05 |
| 410 | 9,251E-01 | 710 | 6,280E-01 | 1010 | 2,029E-02 | 1750 | 4,196E-02 | 3250 | 1,208E-04 | 4750 | < 1,000E-05 |
| 420 | 9,205E-01 | 720 | 5,921E-01 | 1020 | 1,846E-02 | 1800 | 4,558E-02 | 3300 | 1,397E-04 | 4800 | < 1,000E-05 |
| 430 | 9,222E-01 | 730 | 5,530E-01 | 1030 | 1,677E-02 | 1850 | 4,635E-02 | 3350 | 1,594E-04 | 4850 | < 1,000E-05 |
| 440 | 9,284E-01 | 740 | 5,170E-01 | 1040 | 1,525E-02 | 1900 | 4,488E-02 | 3400 | 1,805E-04 | 4900 | < 1,000E-05 |
| 450 | 9,309E-01 | 750 | 4,770E-01 | 1050 | 1,404E-02 | 1950 | 4,284E-02 | 3450 | 2,178E-04 | 4950 | < 1,000E-05 |
| 460 | 9,274E-01 | 760 | 4,393E-01 | 1060 | 1,300E-02 | 2000 | 4,076E-02 | 3500 | 2,881E-04 | 5000 | < 1,000E-05 |
| 470 | 9,315E-01 | 770 | 4,012E-01 | 1070 | 1,212E-02 | 2050 | 3,830E-02 | 3550 | 3,919E-04 | 5050 | < 1,000E-05 |
| 480 | 9,362E-01 | 780 | 3,658E-01 | 1080 | 1,133E-02 | 2100 | 3,616E-02 | 3600 | 5,113E-04 | 5100 | < 1,000E-05 |
| 490 | 9,408E-01 | 790 | 3,290E-01 | 1090 | 1,062E-02 | 2150 | 3,447E-02 | 3650 | 6,113E-04 | 5150 | < 1,000E-05 |

# Data Sheet

## KG2

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,921 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | ≥ | 0,93 | |
| $\tau_i$ (500 nm) | ≥ | 0,94 | |
| $\tau_i$ (600 nm) | ≥ | 0,92 | |
| $\tau_i$ (700 nm) | ≤ | 0,83 | |
| $\tau_i$ (800 nm) | ≤ | 0,55 | |
| $\tau_i$ (900 nm) | ≤ | 0,28 | |
| $\tau_i$ (1060 nm) | ≤ | 0,12 | |
| $\tau_i$ (2200 nm) | ≤ | 0,2 | |
| **Refractive indices** | | | |
| | | | |
| | | | |
| $n_d$ (587,6 nm) | = | 1,51 | |
| | | | |
| **Sellmeier coefficients** | | | |
| on request | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| **Internal quality** | | | |
| Bubble class | | 3 | |

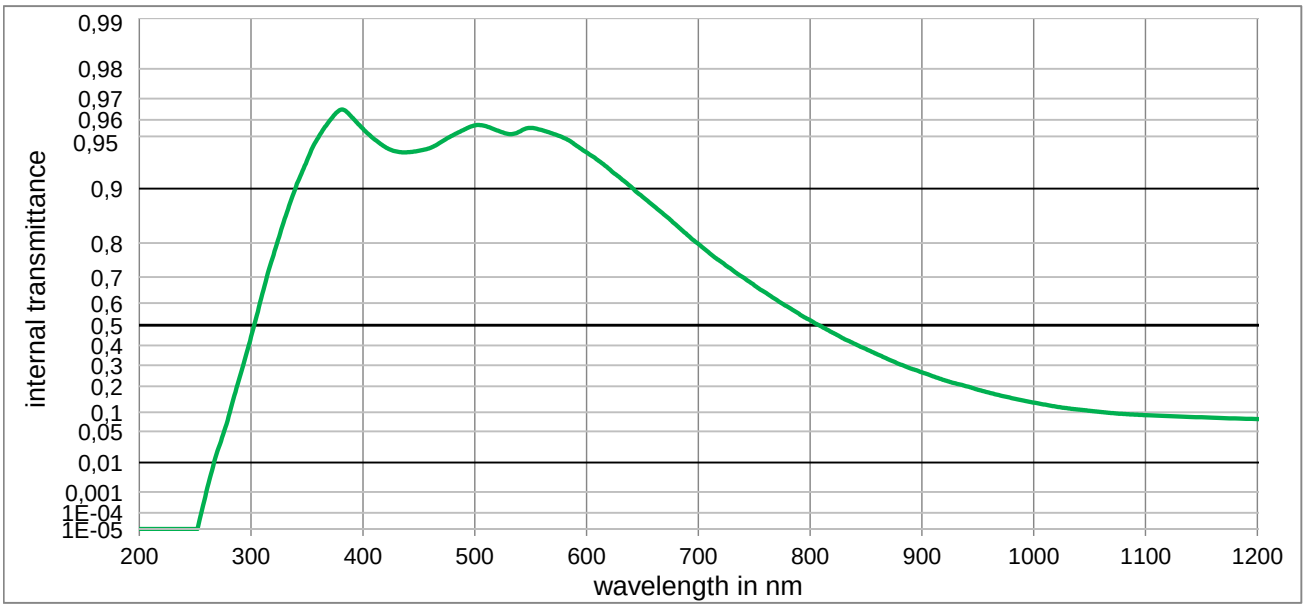
| Mechanical properties | | |
|---|---|---|
| **Reference thickness** | | |
| d | = | 2,00 mm |
| **Density** | | |
| ρ | = | 2,52 g/cm³ |
| **Knoop hardness** | | |
| HK[0.1/20] | = | 444 |

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

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 0 |
| SR class | = | 2 |
| AR class | = | 3 |
| **Resistance against humidity** | | |
| Delicate glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

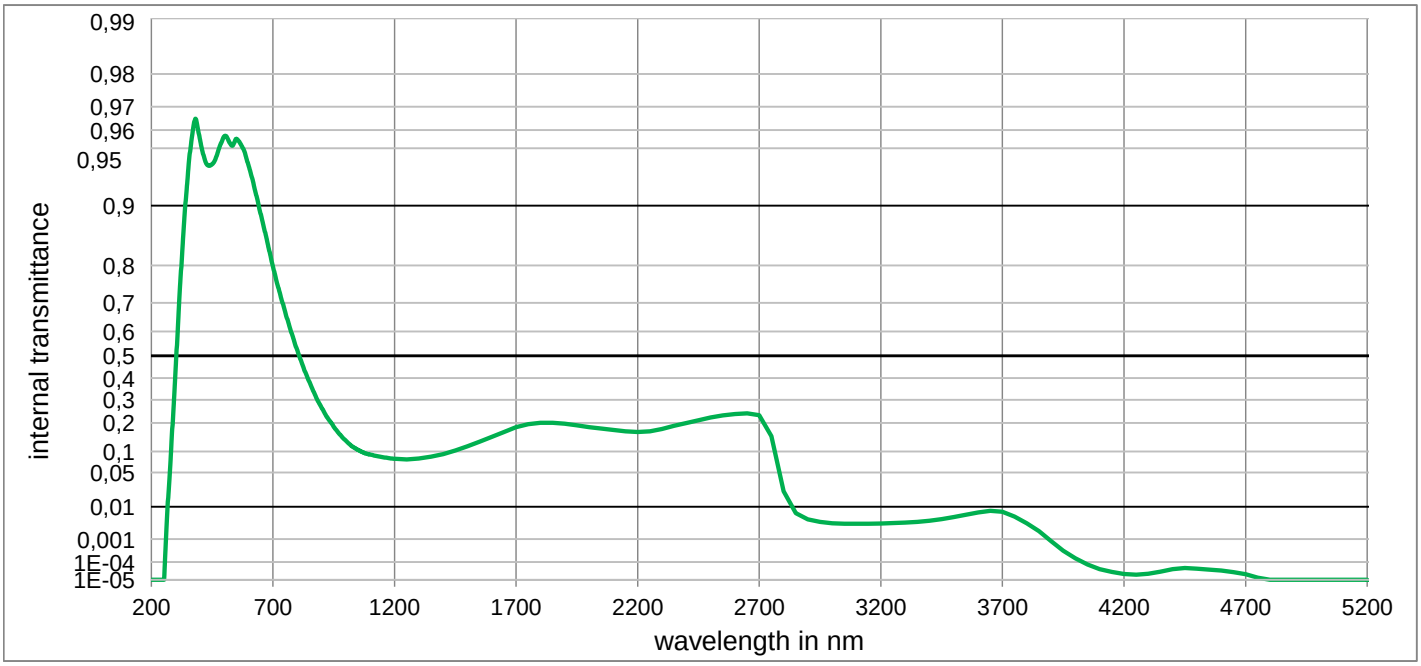
| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,312 | 0,311 | 0,310 |
| | y | 0,330 | 0,331 | 0,331 |
| | Y | 89,5 | 87,1 | 84,7 |
| | $\lambda_d$ | 501 nm | 501 nm | 501 nm |
| | $P_e$ | 0,003 | 0,007 | 0,010 |
| Illuminant A | x | 0,446 | 0,444 | 0,442 |
| | y | 0,409 | 0,410 | 0,411 |
| | Y | 89,3 | 86,7 | 84,2 |
| | $\lambda_d$ | 506 nm | 507 nm | 507 nm |
| | $P_e$ | 0,004 | 0,008 | 0,012 |

| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Shortpass filter |
| |
| Heat protection filter |
| DIN 58131 |
| |
| **Disclaimer** |
| All data without tolerances are to be understood to be reference values. |



# Data Sheet

## KG2




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,569E-01 | 800 | 5,237E-01 | 1100 | 9,099E-02 | 2200 | 1,647E-01 | 3700 | 7,376E-03 |
| 210 | < 1,0E-05 | 510 | 9,564E-01 | 810 | 4,940E-01 | 1110 | 8,975E-02 | 2250 | 1,671E-01 | 3750 | 5,454E-03 |
| 220 | < 1,0E-05 | 520 | 9,538E-01 | 820 | 4,640E-01 | 1120 | 8,844E-02 | 2300 | 1,764E-01 | 3800 | 3,463E-03 |
| 230 | < 1,0E-05 | 530 | 9,516E-01 | 830 | 4,342E-01 | 1130 | 8,715E-02 | 2350 | 1,885E-01 | 3850 | 1,917E-03 |
| 240 | < 1,0E-05 | 540 | 9,531E-01 | 840 | 4,080E-01 | 1140 | 8,600E-02 | 2400 | 1,997E-01 | 3900 | 8,350E-04 |
| 250 | < 1,0E-05 | 550 | 9,554E-01 | 850 | 3,822E-01 | 1150 | 8,470E-02 | 2450 | 2,114E-01 | 3950 | 3,360E-04 |
| 260 | 1,0E-03 | 560 | 9,541E-01 | 860 | 3,557E-01 | 1160 | 8,350E-02 | 2500 | 2,227E-01 | 4000 | 1,525E-04 |
| 270 | 2,0E-02 | 570 | 9,518E-01 | 870 | 3,300E-01 | 1170 | 8,252E-02 | 2550 | 2,311E-01 | 4050 | 7,328E-05 |
| 280 | 8,8E-02 | 580 | 9,489E-01 | 880 | 3,054E-01 | 1180 | 8,150E-02 | 2600 | 2,370E-01 | 4100 | 4,198E-05 |
| 290 | 2,5E-01 | 590 | 9,440E-01 | 890 | 2,840E-01 | 1190 | 8,070E-02 | 2650 | 2,404E-01 | 4150 | 2,924E-05 |
| 300 | 4,4E-01 | 600 | 9,380E-01 | 900 | 2,652E-01 | 1200 | 8,005E-02 | 2700 | 2,327E-01 | 4200 | 2,239E-05 |
| 310 | 6,4E-01 | 610 | 9,314E-01 | 910 | 2,457E-01 | 1250 | 7,868E-02 | 2750 | 1,493E-01 | 4250 | 2,065E-05 |
| 320 | 7,690E-01 | 620 | 9,230E-01 | 920 | 2,280E-01 | 1300 | 8,103E-02 | 2800 | 2,260E-02 | 4300 | 2,344E-05 |
| 330 | 8,522E-01 | 630 | 9,132E-01 | 930 | 2,130E-01 | 1350 | 8,550E-02 | 2850 | 6,823E-03 | 4350 | 3,020E-05 |
| 340 | 9,020E-01 | 640 | 9,020E-01 | 940 | 2,001E-01 | 1400 | 9,250E-02 | 2900 | 4,519E-03 | 4400 | 4,162E-05 |
| 350 | 9,310E-01 | 650 | 8,891E-01 | 950 | 1,850E-01 | 1450 | 1,028E-01 | 2950 | 3,811E-03 | 4450 | 4,823E-05 |
| 360 | 9,492E-01 | 660 | 8,750E-01 | 960 | 1,726E-01 | 1500 | 1,157E-01 | 3000 | 3,483E-03 | 4500 | 4,508E-05 |
| 370 | 9,593E-01 | 670 | 8,590E-01 | 970 | 1,611E-01 | 1550 | 1,305E-01 | 3050 | 3,357E-03 | 4550 | 4,009E-05 |
| 380 | 9,651E-01 | 680 | 8,407E-01 | 980 | 1,510E-01 | 1600 | 1,471E-01 | 3100 | 3,334E-03 | 4600 | 3,556E-05 |
| 390 | 9,615E-01 | 690 | 8,199E-01 | 990 | 1,415E-01 | 1650 | 1,651E-01 | 3150 | 3,357E-03 | 4650 | 2,884E-05 |
| 400 | 9,549E-01 | 700 | 7,980E-01 | 1000 | 1,333E-01 | 1700 | 1,835E-01 | 3200 | 3,420E-03 | 4700 | 2,143E-05 |
| 410 | 9,482E-01 | 710 | 7,740E-01 | 1010 | 1,259E-01 | 1750 | 1,951E-01 | 3250 | 3,491E-03 | 4750 | 1,346E-05 |
| 420 | 9,423E-01 | 720 | 7,499E-01 | 1020 | 1,189E-01 | 1800 | 2,007E-01 | 3300 | 3,614E-03 | 4800 | < 1,000E-05 |
| 430 | 9,388E-01 | 730 | 7,250E-01 | 1030 | 1,133E-01 | 1850 | 2,011E-01 | 3350 | 3,793E-03 | 4850 | < 1,000E-05 |
| 440 | 9,382E-01 | 740 | 6,990E-01 | 1040 | 1,089E-01 | 1900 | 1,971E-01 | 3400 | 4,130E-03 | 4900 | < 1,000E-05 |
| 450 | 9,393E-01 | 750 | 6,710E-01 | 1050 | 1,047E-01 | 1950 | 1,905E-01 | 3450 | 4,645E-03 | 4950 | < 1,000E-05 |
| 460 | 9,416E-01 | 760 | 6,428E-01 | 1060 | 1,009E-01 | 2000 | 1,834E-01 | 3500 | 5,333E-03 | 5000 | < 1,000E-05 |
| 470 | 9,461E-01 | 770 | 6,130E-01 | 1070 | 9,748E-02 | 2050 | 1,776E-01 | 3550 | 6,109E-03 | 5050 | < 1,000E-05 |
| 480 | 9,506E-01 | 780 | 5,840E-01 | 1080 | 9,478E-02 | 2100 | 1,724E-01 | 3600 | 7,119E-03 | 5100 | < 1,000E-05 |
| 490 | 9,542E-01 | 790 | 5,530E-01 | 1090 | 9,283E-02 | 2150 | 1,676E-01 | 3650 | 7,893E-03 | 5150 | < 1,000E-05 |

# Data Sheet

## KG3

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,919 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | | ≥ | 0,86 |
| $\tau_i$ (500 nm) | | ≥ | 0,88 |
| $\tau_i$ (600 nm) | | ≥ | 0,83 |
| $\tau_i$ (700 nm) | | ≤ | 0,55 |
| $\tau_i$ (800 nm) | | ≤ | 0,14 |
| $\tau_i$ (900 nm) | | ≤ | 0,03 |
| $\tau_i$ (1060 nm) | | ≤ | 0,001 |
| $\tau_i$ (2200 nm) | | ≤ | 0,01 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,52 |
| $n_d$ (587,6 nm) | | = | 1,52 |
| | | | |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1600 nm | | | |
| $B_1$ | 1,1717 | | |
| $B_2$ | 0,0980 | | |
| $B_3$ | 0,0713 | | |
| $C_1$ | 6,324E-03 µm² | | |
| $C_2$ | 3,1092E-02 µm² | | |
| $C_3$ | 10,066 µm² | | |
| **Internal quality** | | | |
| Bubble class | 3 | | |

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

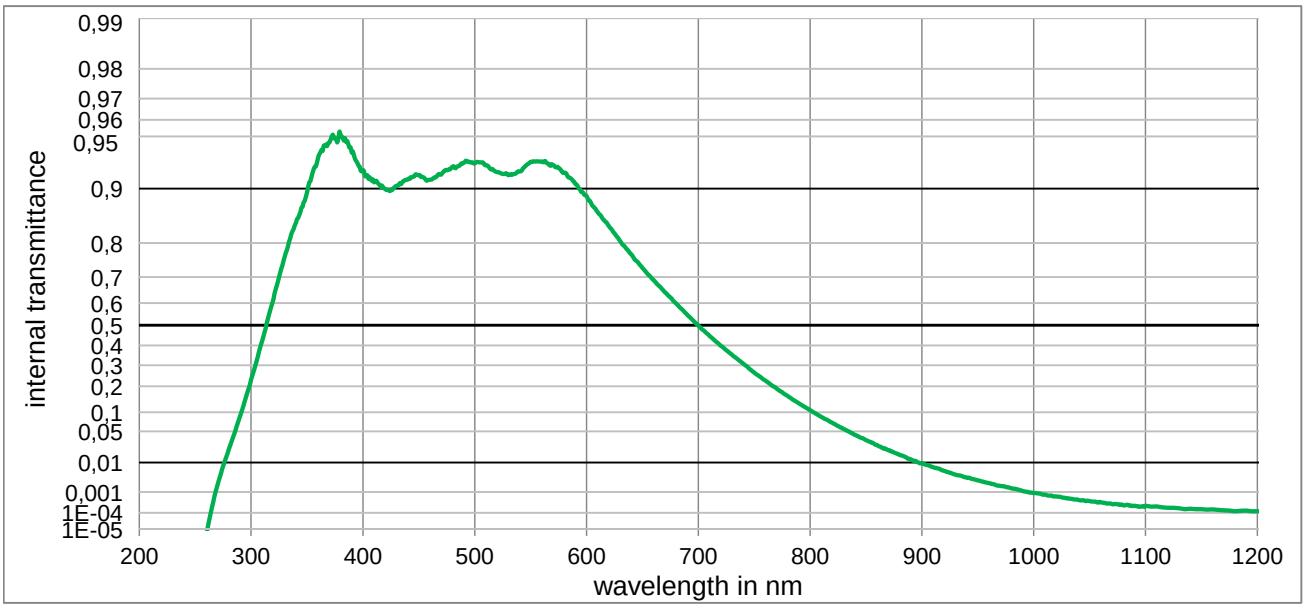
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 581 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 5,3 |
| $\alpha_{(20°C/300°C)}$ | | = | 6,1 |
| | | | |
| | | | |
| | | | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 2 |
| | AR class | = | 4 |
| **Resistance against humidity** | | | |
| Delicate glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

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

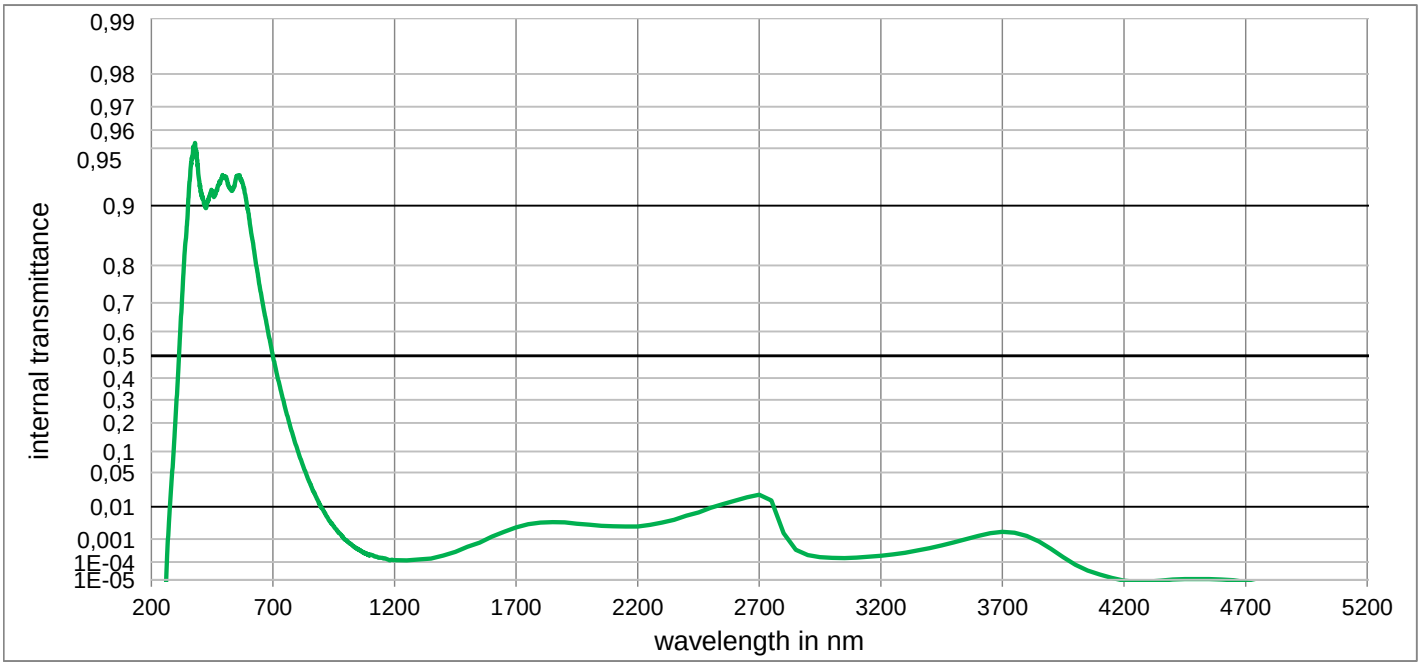
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Shortpass filter |
| |
| Heat protection filter |
| DIN 58131 |
| |

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



# Data Sheet

## KG3




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 9,282E-01 | 800 | 1,066E-01 | 1100 | 2,334E-04 | 2200 | 2,727E-03 | 3700 | 1,822E-03 |
| 210 | < 1,0E-05 | 510 | 9,265E-01 | 810 | 8,548E-02 | 1110 | 2,163E-04 | 2250 | 3,103E-03 | 3750 | 1,693E-03 |
| 220 | < 1,0E-05 | 520 | 9,194E-01 | 820 | 6,913E-02 | 1120 | 1,828E-04 | 2300 | 3,642E-03 | 3800 | 1,292E-03 |
| 230 | < 1,0E-05 | 530 | 9,162E-01 | 830 | 5,533E-02 | 1130 | 1,729E-04 | 2350 | 4,394E-03 | 3850 | 8,111E-04 |
| 240 | < 1,0E-05 | 540 | 9,202E-01 | 840 | 4,313E-02 | 1140 | 1,649E-04 | 2400 | 5,839E-03 | 3900 | 4,055E-04 |
| 250 | < 1,0E-05 | 550 | 9,298E-01 | 850 | 3,387E-02 | 1150 | 1,586E-04 | 2450 | 7,150E-03 | 3950 | 1,710E-04 |
| 260 | < 1,0E-05 | 560 | 9,303E-01 | 860 | 2,668E-02 | 1160 | 1,510E-04 | 2500 | 9,398E-03 | 4000 | 7,230E-05 |
| 270 | 1,9E-03 | 570 | 9,267E-01 | 870 | 2,066E-02 | 1170 | 1,379E-04 | 2550 | 1,160E-02 | 4050 | 3,512E-05 |
| 280 | 2,1E-02 | 580 | 9,189E-01 | 880 | 1,585E-02 | 1180 | 1,201E-04 | 2600 | 1,403E-02 | 4100 | 2,115E-05 |
| 290 | 8,7E-02 | 590 | 9,059E-01 | 890 | 1,195E-02 | 1190 | 1,309E-04 | 2650 | 1,687E-02 | 4150 | 1,291E-05 |
| 300 | 2,3E-01 | 600 | 8,899E-01 | 900 | 9,471E-03 | 1200 | 1,227E-04 | 2700 | 1,917E-02 | 4200 | < 1,000E-05 |
| 310 | 4,3E-01 | 610 | 8,645E-01 | 910 | 7,401E-03 | 1250 | 1,188E-04 | 2750 | 1,420E-02 | 4250 | < 1,000E-05 |
| 320 | 6,184E-01 | 620 | 8,381E-01 | 920 | 5,677E-03 | 1300 | 1,322E-04 | 2800 | 1,641E-03 | 4300 | < 1,000E-05 |
| 330 | 7,634E-01 | 630 | 8,054E-01 | 930 | 4,323E-03 | 1350 | 1,495E-04 | 2850 | 3,690E-04 | 4350 | < 1,000E-05 |
| 340 | 8,445E-01 | 640 | 7,704E-01 | 940 | 3,458E-03 | 1400 | 2,072E-04 | 2900 | 2,146E-04 | 4400 | 1,042E-05 |
| 350 | 8,948E-01 | 650 | 7,303E-01 | 950 | 2,746E-03 | 1450 | 3,025E-04 | 2950 | 1,725E-04 | 4450 | 1,106E-05 |
| 360 | 9,343E-01 | 660 | 6,891E-01 | 960 | 2,212E-03 | 1500 | 4,975E-04 | 3000 | 1,586E-04 | 4500 | 1,106E-05 |
| 370 | 9,455E-01 | 670 | 6,451E-01 | 970 | 1,740E-03 | 1550 | 7,248E-04 | 3050 | 1,571E-04 | 4550 | 1,106E-05 |
| 380 | 9,509E-01 | 680 | 5,988E-01 | 980 | 1,401E-03 | 1600 | 1,222E-03 | 3100 | 1,649E-04 | 4600 | 1,042E-05 |
| 390 | 9,379E-01 | 690 | 5,497E-01 | 990 | 1,092E-03 | 1650 | 1,812E-03 | 3150 | 1,794E-04 | 4650 | < 1,000E-05 |
| 400 | 9,217E-01 | 700 | 4,982E-01 | 1000 | 9,072E-04 | 1700 | 2,542E-03 | 3200 | 2,000E-04 | 4700 | < 1,000E-05 |
| 410 | 9,079E-01 | 710 | 4,482E-01 | 1010 | 7,715E-04 | 1750 | 3,228E-03 | 3250 | 2,324E-04 | 4750 | < 1,000E-05 |
| 420 | 8,992E-01 | 720 | 3,989E-01 | 1020 | 6,422E-04 | 1800 | 3,652E-03 | 3300 | 2,755E-04 | 4800 | < 1,000E-05 |
| 430 | 9,037E-01 | 730 | 3,535E-01 | 1030 | 5,357E-04 | 1850 | 3,770E-03 | 3350 | 3,430E-04 | 4850 | < 1,000E-05 |
| 440 | 9,112E-01 | 740 | 3,084E-01 | 1040 | 4,512E-04 | 1900 | 3,681E-03 | 3400 | 4,356E-04 | 4900 | < 1,000E-05 |
| 450 | 9,159E-01 | 750 | 2,645E-01 | 1050 | 3,972E-04 | 1950 | 3,366E-03 | 3450 | 5,699E-04 | 4950 | < 1,000E-05 |
| 460 | 9,109E-01 | 760 | 2,263E-01 | 1060 | 3,472E-04 | 2000 | 3,121E-03 | 3500 | 7,511E-04 | 5000 | < 1,000E-05 |
| 470 | 9,167E-01 | 770 | 1,901E-01 | 1070 | 2,827E-04 | 2050 | 2,861E-03 | 3550 | 9,992E-04 | 5050 | < 1,000E-05 |
| 480 | 9,250E-01 | 780 | 1,584E-01 | 1080 | 2,515E-04 | 2100 | 2,785E-03 | 3600 | 1,302E-03 | 5100 | < 1,000E-05 |
| 490 | 9,288E-01 | 790 | 1,302E-01 | 1090 | 2,367E-04 | 2150 | 2,752E-03 | 3650 | 1,630E-03 | 5150 | < 1,000E-05 |

# Data Sheet

SCHOTT

## KG5

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,920 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (365 nm) | | ≥ | 0,8 |
| $\tau_i$ (500 nm) | | ≥ | 0,86 |
| $\tau_i$ (600 nm) | | ≥ | 0,8 |
| $\tau_i$ (700 nm) | | ≤ | 0,43 |
| $\tau_i$ (800 nm) | | ≤ | 0,09 |
| $\tau_i$ (900 nm) | | ≤ | 0,008 |
| $\tau_i$ (1060 nm) | | ≤ | 0,0001 |
| $\tau_i$ (2200 nm) | | ≤ | 0,001 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | | = | 1,52 |
| $n_e$ (546 nm) | | = | 1,51 |
| $n_d$ (587,6 nm) | | = | 1,51 |
| | | | |
| **Sellmeier coefficients** | | | |
| valid from 400 nm to 1550 nm | | | |
| $B_1$ | 1,0371 | | |
| $B_2$ | 0,2237 | | |
| $B_3$ | 33,7882 | | |
| $C_1$ | 9,265E-03 | µm² | |
| $C_2$ | 5,0235E-03 | µm² | |
| $C_3$ | 3577,611 | µm² | |
| **Internal quality** | | | |
| Bubble class | 3 | | |

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

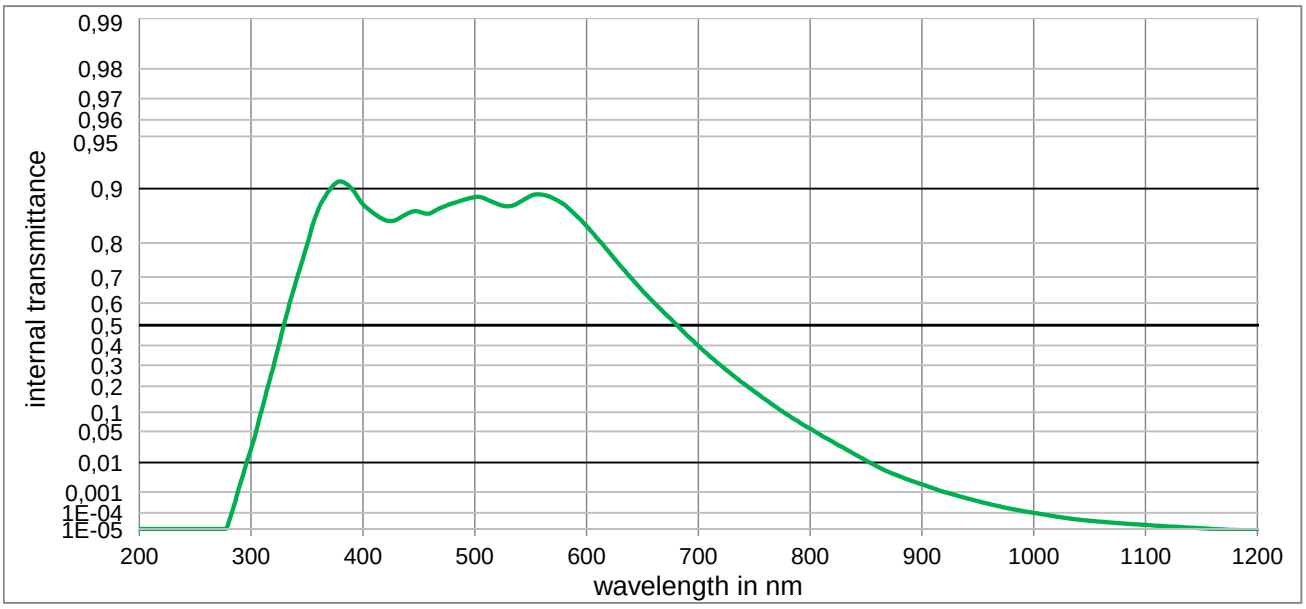
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 565 °C |
| **Thermal expansion in** | | | $10^{-6}$/K |
| $\alpha_{(-30°C/+70°C)}$ | | = | 5,4 |
| $\alpha_{(20°C/300°C)}$ | | = | 6,2 |
| | | | |
| | | | |
| | | | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 0 |
| | SR class | = | 3 |
| | AR class | = | 4 |
| **Resistance against humidity** | | | |
| Delicate glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | | | |
|---|---|---|---|---|
| | | 1 mm | 2 mm | 3 mm |
| Illuminant D65 | x | 0,308 | 0,304 | 0,300 |
| | y | 0,331 | 0,332 | 0,334 |
| | Y | 85,4 | 79,3 | 73,7 |
| | $\lambda_d$ | 496 nm | 496 nm | 496 nm |
| | $P_e$ | 0,015 | 0,029 | 0,042 |
| Illuminant A | x | 0,440 | 0,434 | 0,427 |
| | y | 0,411 | 0,415 | 0,418 |
| | Y | 84,6 | 77,9 | 71,9 |
| | $\lambda_d$ | 504 nm | 505 nm | 505 nm |
| | $P_e$ | 0,016 | 0,031 | 0,045 |

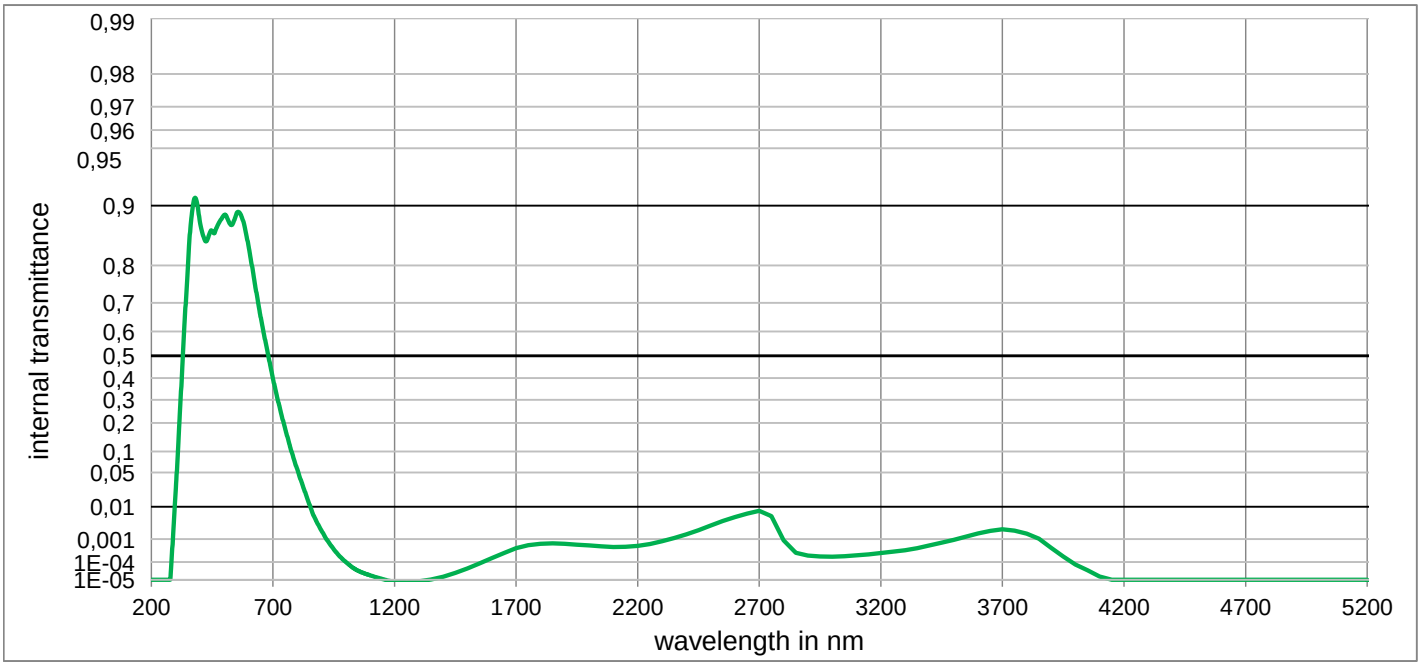
| Notes |
|---|
| UV |
| Transmission changes are possible under the action of intense ultraviolet radiation. |
| Ionically colored glass |
| Shortpass filter |
| |
| Heat protection filter |
| DIN 58131 |
| |

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



# Data Sheet

## KG5




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 8,883E-01 | 800 | 5,600E-02 | 1100 | 1,875E-05 | 2200 | 5,413E-04 | 3700 | 2,208E-03 |
| 210 | < 1,0E-05 | 510 | 8,854E-01 | 810 | 4,211E-02 | 1110 | 1,667E-05 | 2250 | 6,482E-04 | 3750 | 2,015E-03 |
| 220 | < 1,0E-05 | 520 | 8,781E-01 | 820 | 3,171E-02 | 1120 | 1,500E-05 | 2300 | 8,290E-04 | 3800 | 1,577E-03 |
| 230 | < 1,0E-05 | 530 | 8,743E-01 | 830 | 2,311E-02 | 1130 | 1,370E-05 | 2350 | 1,095E-03 | 3850 | 1,039E-03 |
| 240 | < 1,0E-05 | 540 | 8,806E-01 | 840 | 1,632E-02 | 1140 | 1,239E-05 | 2400 | 1,479E-03 | 3900 | 4,560E-04 |
| 250 | < 1,0E-05 | 550 | 8,900E-01 | 850 | 1,135E-02 | 1150 | 1,109E-05 | 2450 | 2,058E-03 | 3950 | 1,861E-04 |
| 260 | < 1,0E-05 | 560 | 8,919E-01 | 860 | 7,720E-03 | 1160 | 1,007E-05 | 2500 | 2,914E-03 | 4000 | 7,390E-05 |
| 270 | < 1,0E-05 | 570 | 8,870E-01 | 870 | 5,300E-03 | 1170 | < 1,000E-05 | 2550 | 4,090E-03 | 4050 | 3,650E-05 |
| 280 | 2,8E-05 | 580 | 8,770E-01 | 880 | 3,839E-03 | 1180 | < 1,000E-05 | 2600 | 5,337E-03 | 4100 | 1,570E-05 |
| 290 | 1,9E-03 | 590 | 8,600E-01 | 890 | 2,716E-03 | 1190 | < 1,000E-05 | 2650 | 6,620E-03 | 4150 | < 1,000E-05 |
| 300 | 2,2E-02 | 600 | 8,380E-01 | 900 | 1,990E-03 | 1200 | < 1,000E-05 | 2700 | 7,858E-03 | 4200 | < 1,000E-05 |
| 310 | 1,1E-01 | 610 | 8,100E-01 | 910 | 1,410E-03 | 1250 | < 1,000E-05 | 2750 | 5,622E-03 | 4250 | < 1,000E-05 |
| 320 | 2,950E-01 | 620 | 7,770E-01 | 920 | 1,000E-03 | 1300 | < 1,000E-05 | 2800 | 8,872E-04 | 4300 | < 1,000E-05 |
| 330 | 5,160E-01 | 630 | 7,380E-01 | 930 | 7,311E-04 | 1350 | 1,050E-05 | 2850 | 2,754E-04 | 4350 | < 1,000E-05 |
| 340 | 6,840E-01 | 640 | 6,960E-01 | 940 | 5,320E-04 | 1400 | 1,549E-05 | 2900 | 2,037E-04 | 4400 | < 1,000E-05 |
| 350 | 7,950E-01 | 650 | 6,500E-01 | 950 | 3,917E-04 | 1450 | 2,588E-05 | 2950 | 1,856E-04 | 4450 | < 1,000E-05 |
| 360 | 8,690E-01 | 660 | 6,040E-01 | 960 | 2,877E-04 | 1500 | 4,550E-05 | 3000 | 1,817E-04 | 4500 | < 1,000E-05 |
| 370 | 8,980E-01 | 670 | 5,550E-01 | 970 | 2,153E-04 | 1550 | 8,507E-05 | 3050 | 1,894E-04 | 4550 | < 1,000E-05 |
| 380 | 9,090E-01 | 680 | 5,050E-01 | 980 | 1,633E-04 | 1600 | 1,545E-04 | 3100 | 2,083E-04 | 4600 | < 1,000E-05 |
| 390 | 8,998E-01 | 690 | 4,500E-01 | 990 | 1,256E-04 | 1650 | 2,683E-04 | 3150 | 2,330E-04 | 4650 | < 1,000E-05 |
| 400 | 8,774E-01 | 700 | 3,980E-01 | 1000 | 9,931E-05 | 1700 | 4,375E-04 | 3200 | 2,670E-04 | 4700 | < 1,000E-05 |
| 410 | 8,619E-01 | 710 | 3,470E-01 | 1010 | 7,816E-05 | 1750 | 5,757E-04 | 3250 | 3,098E-04 | 4750 | < 1,000E-05 |
| 420 | 8,497E-01 | 720 | 2,990E-01 | 1020 | 6,166E-05 | 1800 | 6,608E-04 | 3300 | 3,557E-04 | 4800 | < 1,000E-05 |
| 430 | 8,505E-01 | 730 | 2,550E-01 | 1030 | 4,932E-05 | 1850 | 6,868E-04 | 3350 | 4,320E-04 | 4850 | < 1,000E-05 |
| 440 | 8,619E-01 | 740 | 2,140E-01 | 1040 | 4,055E-05 | 1900 | 6,537E-04 | 3400 | 5,640E-04 | 4900 | < 1,000E-05 |
| 450 | 8,651E-01 | 750 | 1,780E-01 | 1050 | 3,467E-05 | 1950 | 6,034E-04 | 3450 | 7,280E-04 | 4950 | < 1,000E-05 |
| 460 | 8,620E-01 | 760 | 1,450E-01 | 1060 | 3,006E-05 | 2000 | 5,593E-04 | 3500 | 9,320E-04 | 5000 | < 1,000E-05 |
| 470 | 8,720E-01 | 770 | 1,160E-01 | 1070 | 2,630E-05 | 2050 | 5,136E-04 | 3550 | 1,222E-03 | 5050 | < 1,000E-05 |
| 480 | 8,787E-01 | 780 | 9,200E-02 | 1080 | 2,323E-05 | 2100 | 4,851E-04 | 3600 | 1,604E-03 | 5100 | < 1,000E-05 |
| 490 | 8,841E-01 | 790 | 7,200E-02 | 1090 | 2,075E-05 | 2150 | 4,927E-04 | 3650 | 1,950E-03 | 5150 | < 1,000E-05 |

# Data Sheet

## NG1

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| | $P_d$ | = | 0,918 |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (546 nm) | < | 0,0001 | |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,53 | |
| $n_e$ (546 nm) | = | 1,53 | |
| $n_d$ (587,6 nm) | = | 1,52 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,8361 | |
| $B_2$ | | 0,4344 | |
| $B_3$ | | 0,8624 | |
| $C_1$ | | 1,081E-02 | µm² |
| $C_2$ | | 1,1185E-02 | µm² |
| $C_3$ | | 100,000 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

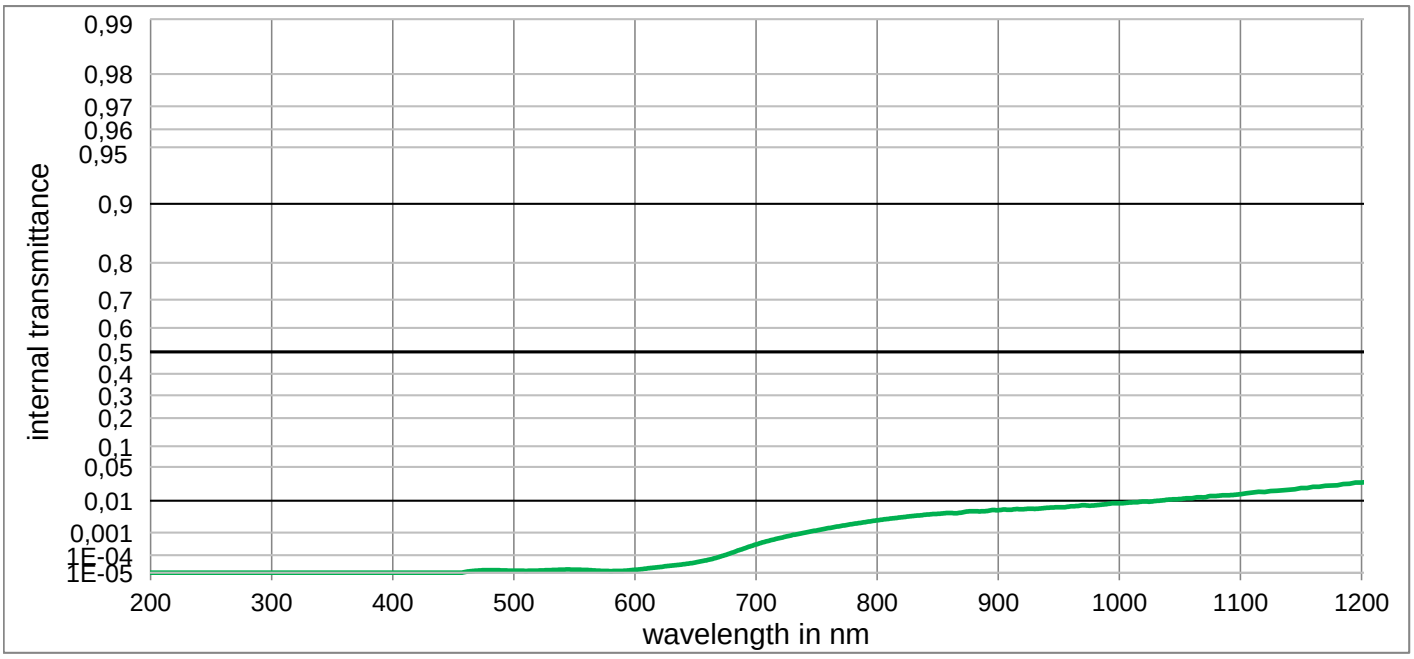
| Thermal properties | | | |
|---|---|---|---|
| **Transformation temperature** | | | |
| | Tg | = | 461 °C |
| **Thermal expansion in** | | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 6,5 | |
| $\alpha_{(20°C/300°C)}$ | = | 7,0 | |

| Chemical properties | | | |
|---|---|---|---|
| **Chemical resistance** | | | |
| | FR class | = | 1 |
| | SR class | = | 2.2 |
| | AR class | = | 1 |
| **Resistance against humidity** | | | |
| Resistant glass | | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

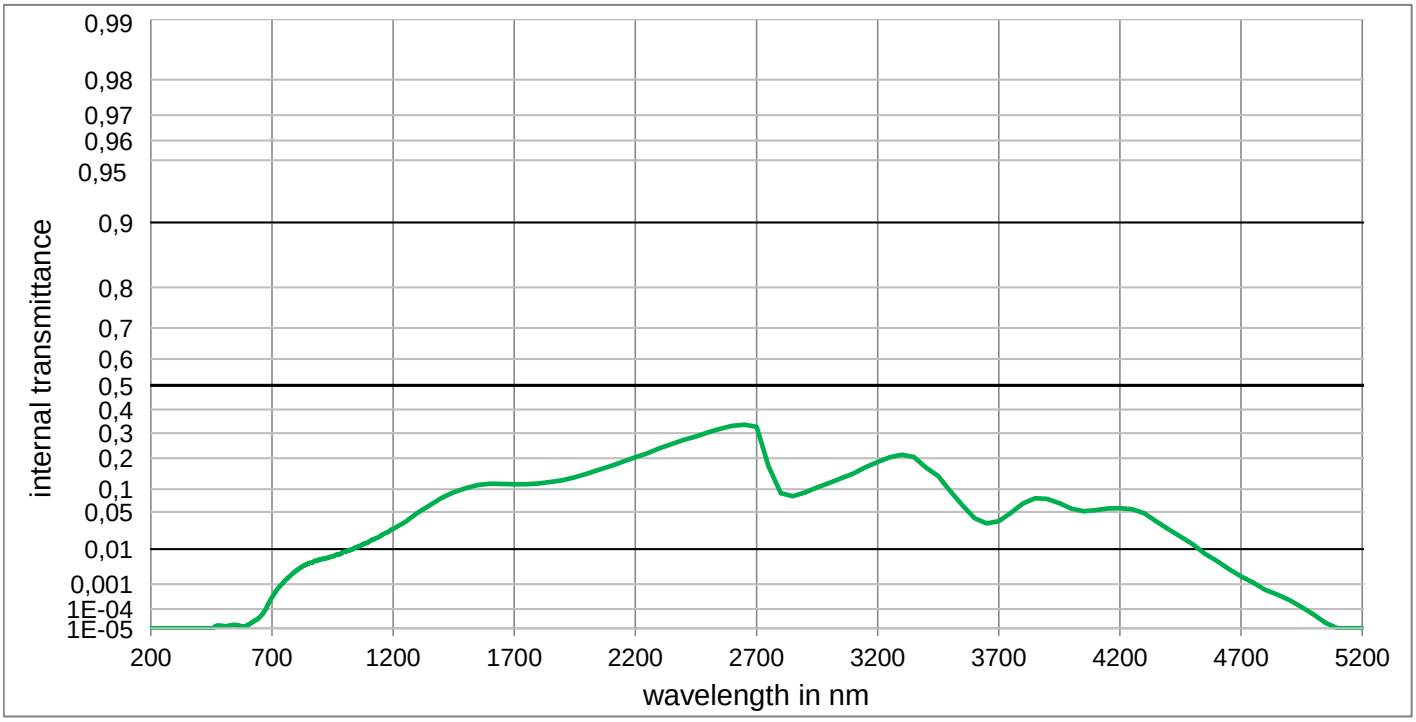
| Notes |
|---|
| |
| Ionically colored glass |
| Neutral density filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## NG1




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 1,340E-05 | 800 | 2,710E-03 | 1100 | 1,444E-02 | 2200 | 2,037E-01 | 3700 | 3,550E-02 |
| 210 | < 1,0E-05 | 510 | 1,317E-05 | 810 | 3,039E-03 | 1110 | 1,580E-02 | 2250 | 2,186E-01 | 3750 | 4,830E-02 |
| 220 | < 1,0E-05 | 520 | 1,365E-05 | 820 | 3,391E-03 | 1120 | 1,615E-02 | 2300 | 2,378E-01 | 3800 | 6,600E-02 |
| 230 | < 1,0E-05 | 530 | 1,459E-05 | 830 | 3,730E-03 | 1130 | 1,720E-02 | 2350 | 2,555E-01 | 3850 | 7,740E-02 |
| 240 | < 1,0E-05 | 540 | 1,559E-05 | 840 | 4,067E-03 | 1140 | 1,811E-02 | 2400 | 2,719E-01 | 3900 | 7,590E-02 |
| 250 | < 1,0E-05 | 550 | 1,559E-05 | 850 | 4,328E-03 | 1150 | 1,976E-02 | 2450 | 2,853E-01 | 3950 | 6,660E-02 |
| 260 | < 1,0E-05 | 560 | 1,482E-05 | 860 | 4,614E-03 | 1160 | 2,103E-02 | 2500 | 3,031E-01 | 4000 | 5,590E-02 |
| 270 | < 1,0E-05 | 570 | 1,338E-05 | 870 | 4,761E-03 | 1170 | 2,212E-02 | 2550 | 3,186E-01 | 4050 | 5,129E-02 |
| 280 | < 1,0E-05 | 580 | 1,272E-05 | 880 | 5,150E-03 | 1180 | 2,265E-02 | 2600 | 3,308E-01 | 4100 | 5,300E-02 |
| 290 | < 1,0E-05 | 590 | 1,315E-05 | 890 | 5,234E-03 | 1190 | 2,446E-02 | 2650 | 3,354E-01 | 4150 | 5,610E-02 |
| 300 | < 1,0E-05 | 600 | 1,533E-05 | 900 | 5,543E-03 | 1200 | 2,600E-02 | 2700 | 3,265E-01 | 4200 | 5,670E-02 |
| 310 | < 1,0E-05 | 610 | 1,841E-05 | 910 | 5,665E-03 | 1250 | 3,480E-02 | 2750 | 1,700E-01 | 4250 | 5,495E-02 |
| 320 | < 1,000E-05 | 620 | 2,208E-05 | 920 | 5,865E-03 | 1300 | 4,830E-02 | 2800 | 8,940E-02 | 4300 | 4,786E-02 |
| 330 | < 1,000E-05 | 630 | 2,692E-05 | 930 | 6,039E-03 | 1350 | 6,230E-02 | 2850 | 8,230E-02 | 4350 | 3,548E-02 |
| 340 | < 1,000E-05 | 640 | 3,251E-05 | 940 | 6,463E-03 | 1400 | 7,810E-02 | 2900 | 9,160E-02 | 4400 | 2,570E-02 |
| 350 | < 1,000E-05 | 650 | 4,074E-05 | 950 | 6,682E-03 | 1450 | 9,190E-02 | 2950 | 1,043E-01 | 4450 | 1,862E-02 |
| 360 | < 1,000E-05 | 660 | 5,559E-05 | 960 | 7,102E-03 | 1500 | 1,029E-01 | 3000 | 1,171E-01 | 4500 | 1,288E-02 |
| 370 | < 1,000E-05 | 670 | 8,318E-05 | 970 | 7,607E-03 | 1550 | 1,114E-01 | 3050 | 1,313E-01 | 4550 | 7,762E-03 |
| 380 | < 1,000E-05 | 680 | 1,321E-04 | 980 | 7,578E-03 | 1600 | 1,150E-01 | 3100 | 1,469E-01 | 4600 | 5,129E-03 |
| 390 | < 1,000E-05 | 690 | 2,104E-04 | 990 | 8,216E-03 | 1650 | 1,143E-01 | 3150 | 1,675E-01 | 4650 | 3,020E-03 |
| 400 | < 1,000E-05 | 700 | 3,243E-04 | 1000 | 8,560E-03 | 1700 | 1,136E-01 | 3200 | 1,860E-01 | 4700 | 1,820E-03 |
| 410 | < 1,000E-05 | 710 | 4,624E-04 | 1010 | 9,052E-03 | 1750 | 1,136E-01 | 3250 | 2,040E-01 | 4750 | 1,122E-03 |
| 420 | < 1,000E-05 | 720 | 6,152E-04 | 1020 | 9,580E-03 | 1800 | 1,157E-01 | 3300 | 2,129E-01 | 4800 | 6,310E-04 |
| 430 | < 1,000E-05 | 730 | 7,998E-04 | 1030 | 9,838E-03 | 1850 | 1,200E-01 | 3350 | 2,044E-01 | 4850 | 4,169E-04 |
| 440 | < 1,000E-05 | 740 | 9,863E-04 | 1040 | 1,064E-02 | 1900 | 1,256E-01 | 3400 | 1,661E-01 | 4900 | 2,455E-04 |
| 450 | < 1,000E-05 | 750 | 1,208E-03 | 1050 | 1,101E-02 | 1950 | 1,349E-01 | 3450 | 1,384E-01 | 4950 | 1,230E-04 |
| 460 | 1,119E-05 | 760 | 1,469E-03 | 1060 | 1,158E-02 | 2000 | 1,455E-01 | 3500 | 9,440E-02 | 5000 | 5,495E-05 |
| 470 | 1,365E-05 | 770 | 1,738E-03 | 1070 | 1,212E-02 | 2050 | 1,590E-01 | 3550 | 6,250E-02 | 5050 | 1,995E-05 |
| 480 | 1,434E-05 | 780 | 2,046E-03 | 1080 | 1,309E-02 | 2100 | 1,718E-01 | 3600 | 4,000E-02 | 5100 | < 1,000E-05 |
| 490 | 1,409E-05 | 790 | 2,360E-03 | 1090 | 1,361E-02 | 2150 | 1,876E-01 | 3650 | 3,270E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## NG3

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,921 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | = | 0,06 | ± 0,02 |
| $\tau_i$ (546 nm) | = | 0,1 | ± 0,02 |
| $\tau_i$ (694 nm) | = | 0,17 | ± 0,03 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,514 | |
| $n_e$ (546 nm) | = | 1,509 | |
| $n_d$ (587,6 nm) | = | 1,507 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,8995 | |
| $B_2$ | | 0,3364 | |
| $B_3$ | | 32,4433 | |
| $C_1$ | | 9,703E-03 | µm² |
| $C_2$ | | 1,2385E-02 | µm² |
| $C_3$ | | 4153,754 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

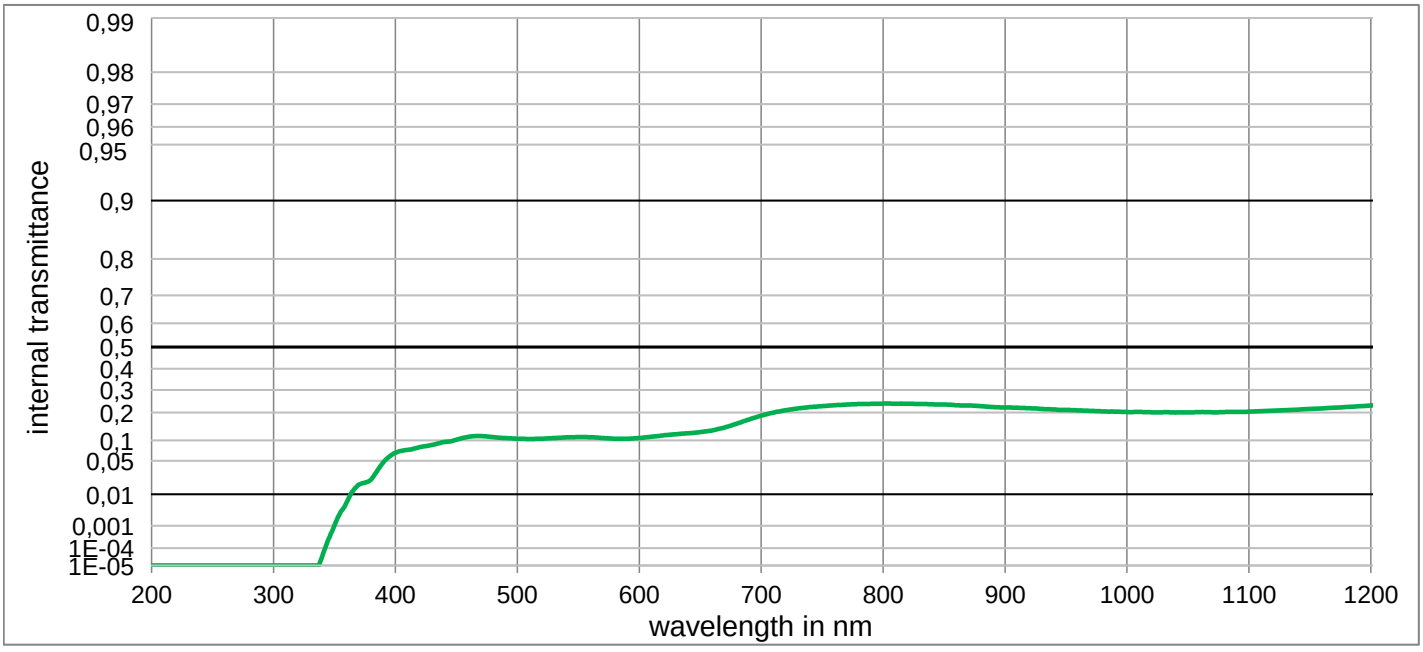
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = | 462 °C |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 6,5 |
| $\alpha_{(20°C/300°C)}$ | = | 7,3 |

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 2.2 |
| AR class | = | 1 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

| Colormetric properties | | | |
|---|---|---|---|
| | 1 mm | 2 mm | 3 mm |
| Illuminant D65 x | | | |
| Illuminant D65 y | | | |
| Illuminant D65 Y | | | |
| Illuminant D65 $\lambda_d$ | | | |
| Illuminant D65 $P_e$ | | | |
| Illuminant A x | | | |
| Illuminant A y | | | |
| Illuminant A Y | | | |
| Illuminant A $\lambda_d$ | | | |
| Illuminant A $P_e$ | | | |

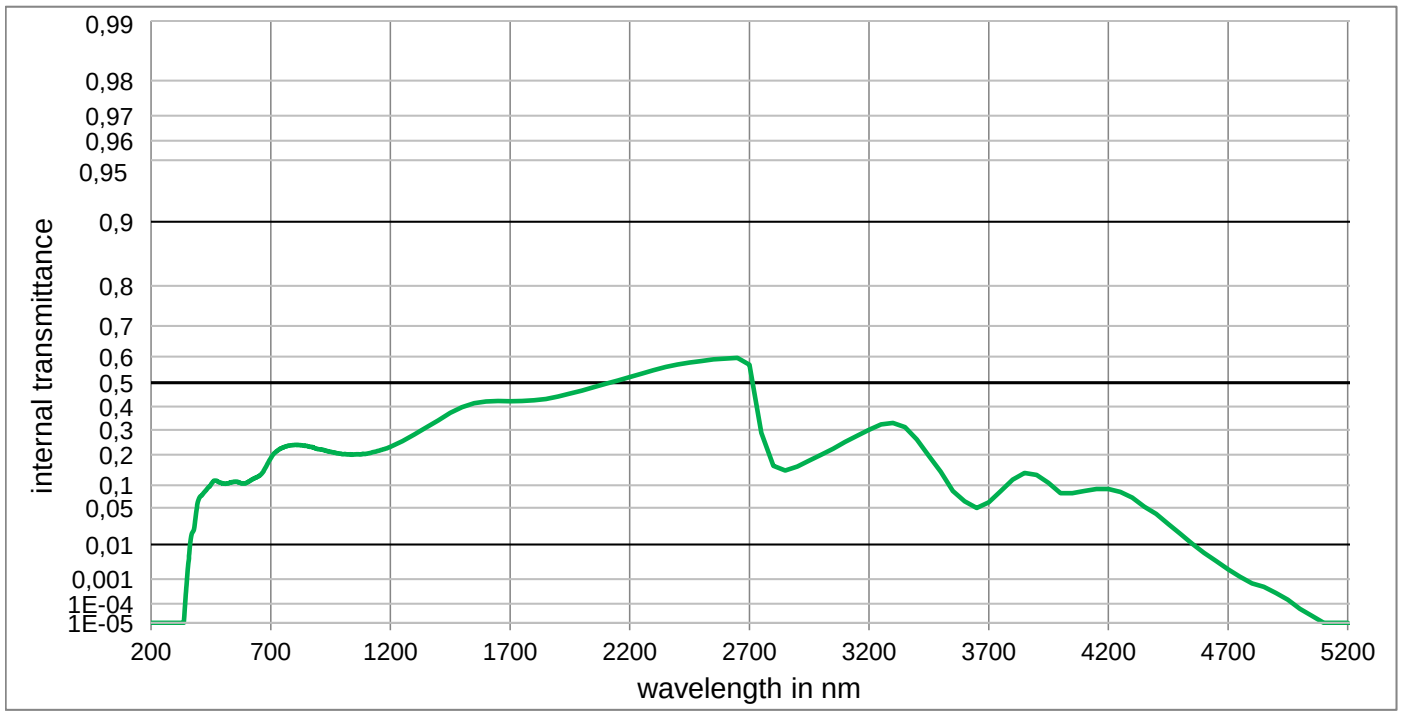
| Notes |
|---|
| Ionically colored glass |
| Neutral density filter |
| DIN 58131 |

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



# Data Sheet

## NG3




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 1,050E-01 | 800 | 2,380E-01 | 1100 | 2,034E-01 | 2200 | 5,225E-01 | 3700 | 6,000E-02 |
| 210 | < 1,0E-05 | 510 | 1,043E-01 | 810 | 2,375E-01 | 1110 | 2,054E-01 | 2250 | 5,360E-01 | 3750 | 8,480E-02 |
| 220 | < 1,0E-05 | 520 | 1,050E-01 | 820 | 2,370E-01 | 1120 | 2,077E-01 | 2300 | 5,500E-01 | 3800 | 1,156E-01 |
| 230 | < 1,0E-05 | 530 | 1,070E-01 | 830 | 2,360E-01 | 1130 | 2,100E-01 | 2350 | 5,617E-01 | 3850 | 1,363E-01 |
| 240 | < 1,0E-05 | 540 | 1,090E-01 | 840 | 2,350E-01 | 1140 | 2,124E-01 | 2400 | 5,711E-01 | 3900 | 1,300E-01 |
| 250 | < 1,0E-05 | 550 | 1,100E-01 | 850 | 2,340E-01 | 1150 | 2,149E-01 | 2450 | 5,786E-01 | 3950 | 1,068E-01 |
| 260 | < 1,0E-05 | 560 | 1,095E-01 | 860 | 2,310E-01 | 1160 | 2,175E-01 | 2500 | 5,837E-01 | 4000 | 8,000E-02 |
| 270 | < 1,0E-05 | 570 | 1,071E-01 | 870 | 2,300E-01 | 1170 | 2,202E-01 | 2550 | 5,900E-01 | 4050 | 8,000E-02 |
| 280 | < 1,0E-05 | 580 | 1,050E-01 | 880 | 2,270E-01 | 1180 | 2,232E-01 | 2600 | 5,925E-01 | 4100 | 8,511E-02 |
| 290 | < 1,0E-05 | 590 | 1,049E-01 | 890 | 2,230E-01 | 1190 | 2,263E-01 | 2650 | 5,956E-01 | 4150 | 9,016E-02 |
| 300 | < 1,0E-05 | 600 | 1,070E-01 | 900 | 2,210E-01 | 1200 | 2,300E-01 | 2700 | 5,700E-01 | 4200 | 9,000E-02 |
| 310 | < 1,0E-05 | 610 | 1,110E-01 | 910 | 2,200E-01 | 1250 | 2,532E-01 | 2750 | 2,880E-01 | 4250 | 8,318E-02 |
| 320 | < 1,000E-05 | 620 | 1,157E-01 | 920 | 2,180E-01 | 1300 | 2,800E-01 | 2800 | 1,600E-01 | 4300 | 7,000E-02 |
| 330 | < 1,000E-05 | 630 | 1,192E-01 | 930 | 2,150E-01 | 1350 | 3,110E-01 | 2850 | 1,439E-01 | 4350 | 5,176E-02 |
| 340 | 3,855E-05 | 640 | 1,222E-01 | 940 | 2,130E-01 | 1400 | 3,400E-01 | 2900 | 1,574E-01 | 4400 | 4,000E-02 |
| 350 | 1,040E-03 | 650 | 1,260E-01 | 950 | 2,110E-01 | 1450 | 3,732E-01 | 2950 | 1,784E-01 | 4450 | 2,679E-02 |
| 360 | 5,900E-03 | 660 | 1,319E-01 | 960 | 2,090E-01 | 1500 | 3,970E-01 | 3000 | 2,000E-01 | 4500 | 1,726E-02 |
| 370 | 1,704E-02 | 670 | 1,420E-01 | 970 | 2,070E-01 | 1550 | 4,147E-01 | 3050 | 2,224E-01 | 4550 | 1,050E-02 |
| 380 | 2,199E-02 | 680 | 1,560E-01 | 980 | 2,050E-01 | 1600 | 4,216E-01 | 3100 | 2,500E-01 | 4600 | 6,237E-03 |
| 390 | 4,696E-02 | 690 | 1,720E-01 | 990 | 2,040E-01 | 1650 | 4,241E-01 | 3150 | 2,752E-01 | 4650 | 3,750E-03 |
| 400 | 6,691E-02 | 700 | 1,871E-01 | 1000 | 2,020E-01 | 1700 | 4,230E-01 | 3200 | 3,000E-01 | 4700 | 2,128E-03 |
| 410 | 7,402E-02 | 710 | 2,000E-01 | 1010 | 2,022E-01 | 1750 | 4,241E-01 | 3250 | 3,236E-01 | 4750 | 1,222E-03 |
| 420 | 8,105E-02 | 720 | 2,094E-01 | 1020 | 2,010E-01 | 1800 | 4,273E-01 | 3300 | 3,300E-01 | 4800 | 7,096E-04 |
| 430 | 8,703E-02 | 730 | 2,170E-01 | 1030 | 2,012E-01 | 1850 | 4,325E-01 | 3350 | 3,116E-01 | 4850 | 5,200E-04 |
| 440 | 9,500E-02 | 740 | 2,230E-01 | 1040 | 2,000E-01 | 1900 | 4,425E-01 | 3400 | 2,600E-01 | 4900 | 2,985E-04 |
| 450 | 1,019E-01 | 750 | 2,270E-01 | 1050 | 2,010E-01 | 1950 | 4,546E-01 | 3450 | 1,948E-01 | 4950 | 1,528E-04 |
| 460 | 1,110E-01 | 760 | 2,310E-01 | 1060 | 2,020E-01 | 2000 | 4,674E-01 | 3500 | 1,400E-01 | 5000 | 5,649E-05 |
| 470 | 1,130E-01 | 770 | 2,340E-01 | 1070 | 2,010E-01 | 2050 | 4,813E-01 | 3550 | 8,540E-02 | 5050 | 2,518E-05 |
| 480 | 1,100E-01 | 780 | 2,360E-01 | 1080 | 2,020E-01 | 2100 | 4,957E-01 | 3600 | 6,220E-02 | 5100 | < 1,000E-05 |
| 490 | 1,070E-01 | 790 | 2,370E-01 | 1090 | 2,029E-01 | 2150 | 5,090E-01 | 3650 | 4,960E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## NG4

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,922 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | = | 0,27 | ± 0,03 |
| $\tau_i$ (546 nm) | = | 0,31 | ± 0,03 |
| $\tau_i$ (694 nm) | = | 0,39 | ± 0,04 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,509 | |
| $n_e$ (546 nm) | = | 1,505 | |
| $n_d$ (587,6 nm) | = | 1,503 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,6033 | |
| $B_2$ | | 0,6255 | |
| $B_3$ | | 54,9099 | |
| $C_1$ | | 4,261E-03 | µm² |
| $C_2$ | | 1,4068E-02 | µm² |
| $C_3$ | | 5448,332 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

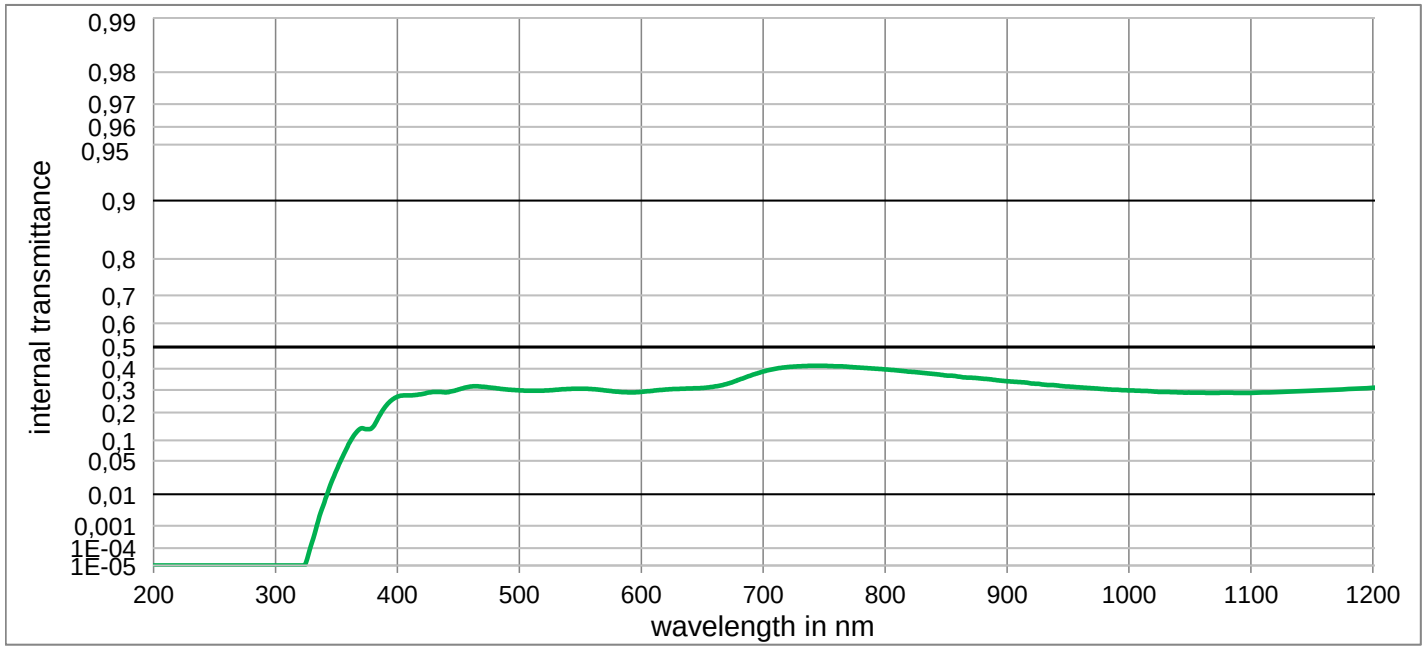
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = | 470 °C |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 6,5 |
| $\alpha_{(20°C/300°C)}$ | = | 7,1 |

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 2.2 |
| AR class | = | 1 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

| Colormetric properties | | | |
|---|---|---|---|
| | 1 mm | 2 mm | 3 mm |
| Illuminant D65 x | | | |
| Illuminant D65 y | | | |
| Illuminant D65 Y | | | |
| Illuminant D65 $\lambda_d$ | | | |
| Illuminant D65 $P_e$ | | | |
| Illuminant A x | | | |
| Illuminant A y | | | |
| Illuminant A Y | | | |
| Illuminant A $\lambda_d$ | | | |
| Illuminant A $P_e$ | | | |

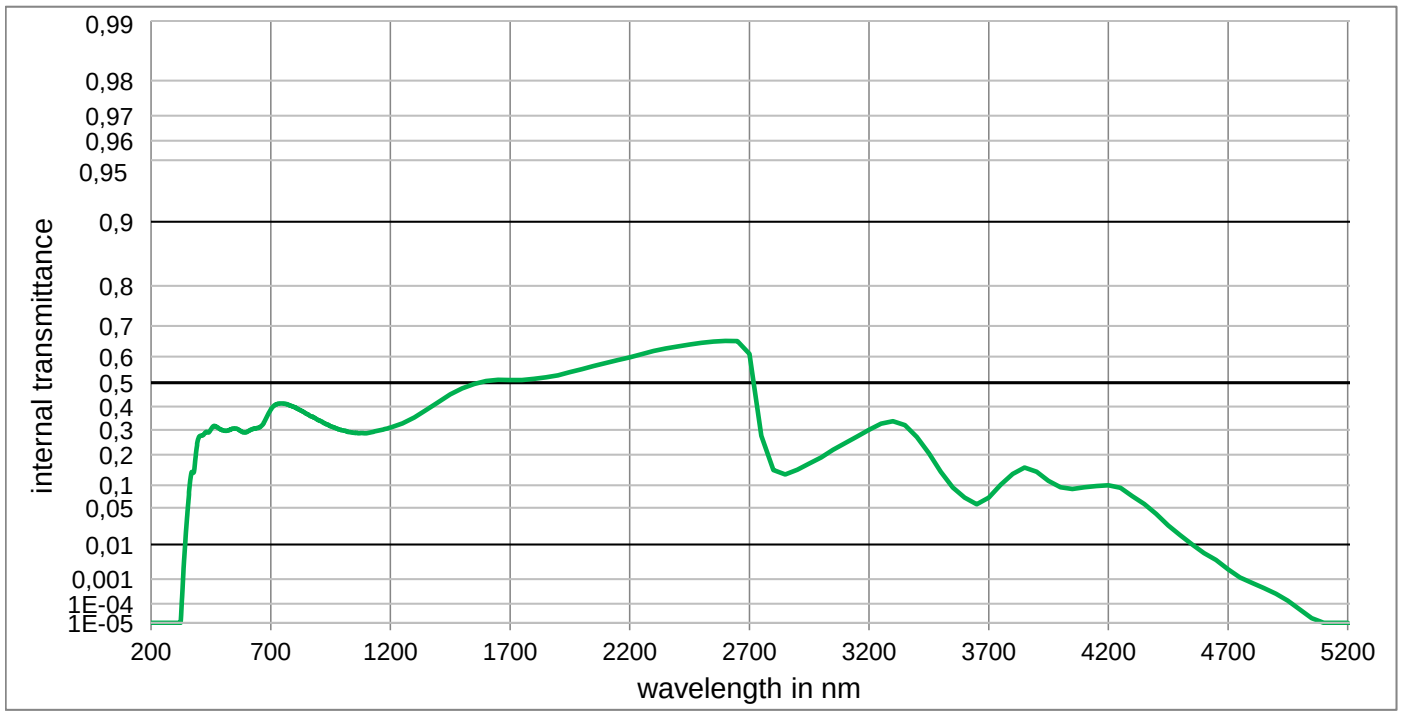
| Notes |
|---|
| Ionically colored glass |
| Neutral density filter |
| DIN 58131 |

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



# Data Sheet

## NG4




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 2,980E-01 | 800 | 3,970E-01 | 1100 | 2,860E-01 | 2200 | 5,974E-01 | 3700 | 7,000E-02 |
| 210 | < 1,0E-05 | 510 | 2,962E-01 | 810 | 3,920E-01 | 1110 | 2,882E-01 | 2250 | 6,084E-01 | 3750 | 1,012E-01 |
| 220 | < 1,0E-05 | 520 | 2,971E-01 | 820 | 3,860E-01 | 1120 | 2,902E-01 | 2300 | 6,200E-01 | 3800 | 1,327E-01 |
| 230 | < 1,0E-05 | 530 | 3,007E-01 | 830 | 3,807E-01 | 1130 | 2,924E-01 | 2350 | 6,289E-01 | 3850 | 1,539E-01 |
| 240 | < 1,0E-05 | 540 | 3,046E-01 | 840 | 3,750E-01 | 1140 | 2,945E-01 | 2400 | 6,355E-01 | 3900 | 1,400E-01 |
| 250 | < 1,0E-05 | 550 | 3,060E-01 | 850 | 3,680E-01 | 1150 | 2,968E-01 | 2450 | 6,421E-01 | 3950 | 1,121E-01 |
| 260 | < 1,0E-05 | 560 | 3,040E-01 | 860 | 3,630E-01 | 1160 | 2,991E-01 | 2500 | 6,472E-01 | 4000 | 9,441E-02 |
| 270 | < 1,0E-05 | 570 | 2,983E-01 | 870 | 3,580E-01 | 1170 | 3,016E-01 | 2550 | 6,516E-01 | 4050 | 9,000E-02 |
| 280 | < 1,0E-05 | 580 | 2,920E-01 | 880 | 3,530E-01 | 1180 | 3,042E-01 | 2600 | 6,538E-01 | 4100 | 9,441E-02 |
| 290 | < 1,0E-05 | 590 | 2,890E-01 | 890 | 3,470E-01 | 1190 | 3,069E-01 | 2650 | 6,531E-01 | 4150 | 9,772E-02 |
| 300 | < 1,0E-05 | 600 | 2,910E-01 | 900 | 3,410E-01 | 1200 | 3,100E-01 | 2700 | 6,100E-01 | 4200 | 1,000E-01 |
| 310 | < 1,0E-05 | 610 | 2,966E-01 | 910 | 3,370E-01 | 1250 | 3,276E-01 | 2750 | 2,750E-01 | 4250 | 9,333E-02 |
| 320 | < 1,000E-05 | 620 | 3,018E-01 | 920 | 3,300E-01 | 1300 | 3,533E-01 | 2800 | 1,459E-01 | 4300 | 7,330E-02 |
| 330 | 1,991E-04 | 630 | 3,050E-01 | 930 | 3,250E-01 | 1350 | 3,855E-01 | 2850 | 1,319E-01 | 4350 | 5,675E-02 |
| 340 | 6,039E-03 | 640 | 3,070E-01 | 940 | 3,220E-01 | 1400 | 4,185E-01 | 2900 | 1,466E-01 | 4400 | 4,000E-02 |
| 350 | 3,390E-02 | 650 | 3,090E-01 | 950 | 3,160E-01 | 1450 | 4,523E-01 | 2950 | 1,679E-01 | 4450 | 2,500E-02 |
| 360 | 8,880E-02 | 660 | 3,159E-01 | 960 | 3,120E-01 | 1500 | 4,764E-01 | 3000 | 1,900E-01 | 4500 | 1,611E-02 |
| 370 | 1,391E-01 | 670 | 3,279E-01 | 970 | 3,080E-01 | 1550 | 4,948E-01 | 3050 | 2,184E-01 | 4550 | 1,000E-02 |
| 380 | 1,439E-01 | 680 | 3,480E-01 | 980 | 3,040E-01 | 1600 | 5,065E-01 | 3100 | 2,448E-01 | 4600 | 6,166E-03 |
| 390 | 2,250E-01 | 690 | 3,685E-01 | 990 | 3,010E-01 | 1650 | 5,116E-01 | 3150 | 2,727E-01 | 4650 | 4,000E-03 |
| 400 | 2,689E-01 | 700 | 3,870E-01 | 1000 | 2,980E-01 | 1700 | 5,109E-01 | 3200 | 3,000E-01 | 4700 | 2,104E-03 |
| 410 | 2,750E-01 | 710 | 4,000E-01 | 1010 | 2,960E-01 | 1750 | 5,109E-01 | 3250 | 3,262E-01 | 4750 | 1,153E-03 |
| 420 | 2,809E-01 | 720 | 4,080E-01 | 1020 | 2,930E-01 | 1800 | 5,153E-01 | 3300 | 3,372E-01 | 4800 | 7,261E-04 |
| 430 | 2,910E-01 | 730 | 4,117E-01 | 1030 | 2,910E-01 | 1850 | 5,219E-01 | 3350 | 3,200E-01 | 4850 | 4,688E-04 |
| 440 | 2,890E-01 | 740 | 4,134E-01 | 1040 | 2,890E-01 | 1900 | 5,292E-01 | 3400 | 2,700E-01 | 4900 | 2,786E-04 |
| 450 | 3,020E-01 | 750 | 4,135E-01 | 1050 | 2,880E-01 | 1950 | 5,417E-01 | 3450 | 2,052E-01 | 4950 | 1,393E-04 |
| 460 | 3,160E-01 | 760 | 4,115E-01 | 1060 | 2,880E-01 | 2000 | 5,534E-01 | 3500 | 1,400E-01 | 5000 | 5,212E-05 |
| 470 | 3,150E-01 | 770 | 4,090E-01 | 1070 | 2,860E-01 | 2050 | 5,659E-01 | 3550 | 9,380E-02 | 5050 | 1,820E-05 |
| 480 | 3,089E-01 | 780 | 4,050E-01 | 1080 | 2,870E-01 | 2100 | 5,769E-01 | 3600 | 7,000E-02 | 5100 | < 1,000E-05 |
| 490 | 3,020E-01 | 790 | 4,010E-01 | 1090 | 2,860E-01 | 2150 | 5,871E-01 | 3650 | 5,640E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## NG5

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,923 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | = | 0,56 | ± 0,03 |
| $\tau_i$ (546 nm) | = | 0,57 | ± 0,03 |
| $\tau_i$ (694 nm) | = | 0,62 | ± 0,03 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,506 | |
| $n_e$ (546 nm) | = | 1,502 | |
| $n_d$ (587,6 nm) | = | 1,5 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,7916 | |
| $B_2$ | | 0,4296 | |
| $B_3$ | | 36,0098 | |
| $C_1$ | | 7,310E-03 | µm² |
| $C_2$ | | 1,2655E-02 | µm² |
| $C_3$ | | 3759,685 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

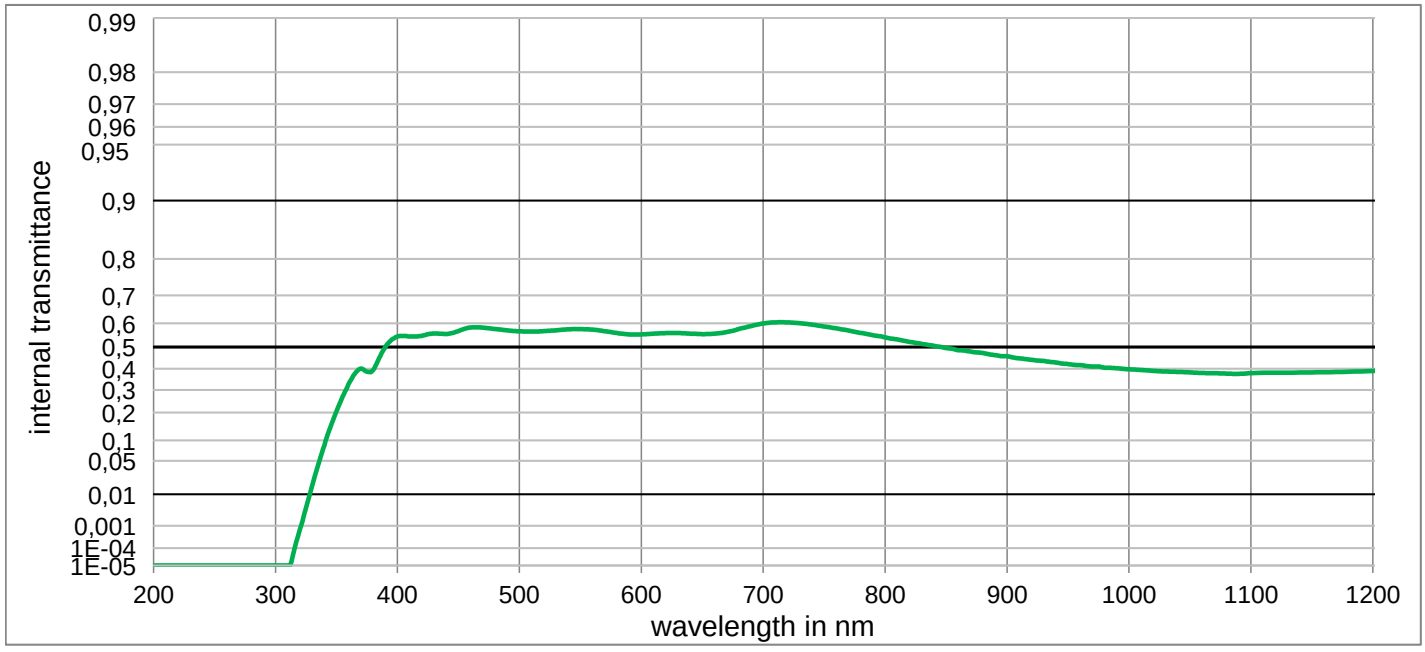
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = | 474 °C |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 6,6 |
| $\alpha_{(20°C/300°C)}$ | = | 7,1 |

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 3.2 |
| AR class | = | 2 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

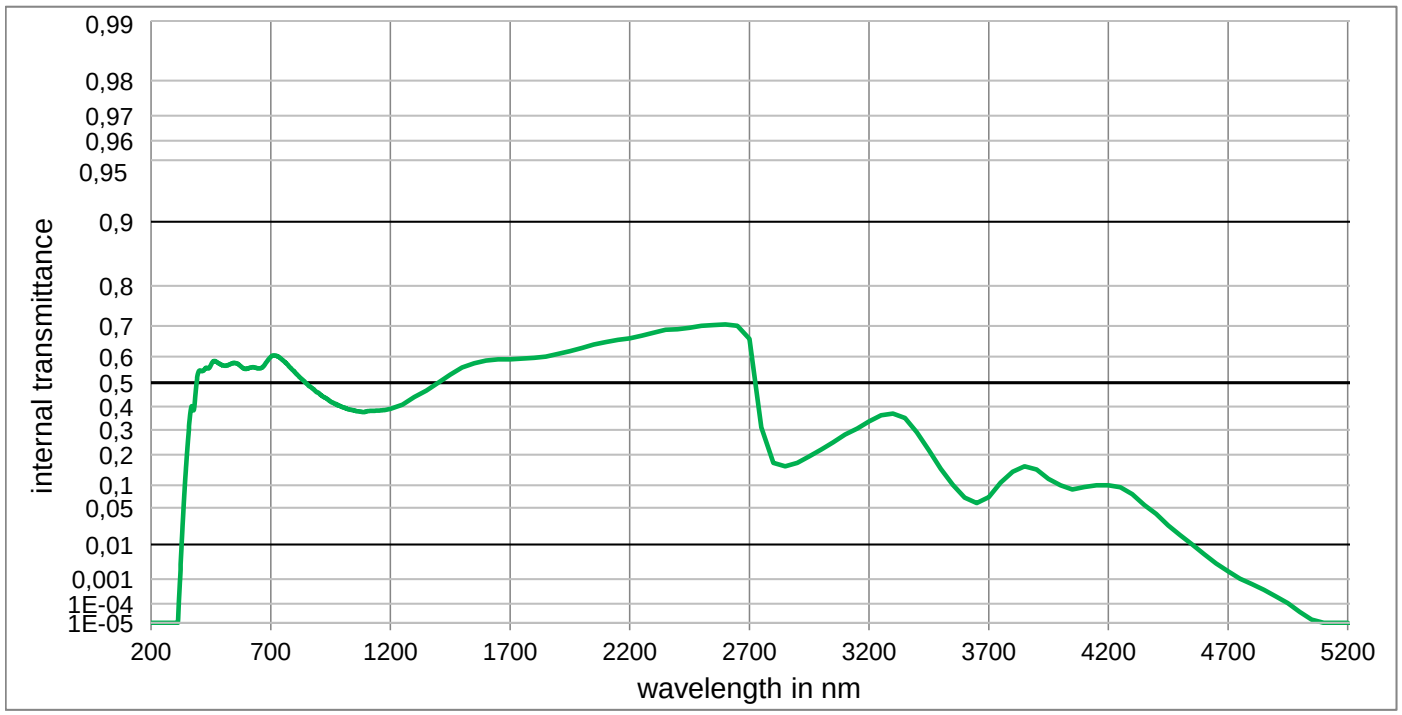
| Notes |
|---|
| |
| Ionically colored glass |
| Neutral density filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## NG5




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 5,677E-01 | 800 | 5,424E-01 | 1100 | 3,794E-01 | 2200 | 6,619E-01 | 3700 | 7,110E-02 |
| 210 | < 1,0E-05 | 510 | 5,667E-01 | 810 | 5,337E-01 | 1110 | 3,808E-01 | 2250 | 6,707E-01 | 3750 | 1,077E-01 |
| 220 | < 1,0E-05 | 520 | 5,684E-01 | 820 | 5,230E-01 | 1120 | 3,812E-01 | 2300 | 6,800E-01 | 3800 | 1,400E-01 |
| 230 | < 1,0E-05 | 530 | 5,717E-01 | 830 | 5,142E-01 | 1130 | 3,816E-01 | 2350 | 6,883E-01 | 3850 | 1,583E-01 |
| 240 | < 1,0E-05 | 540 | 5,757E-01 | 840 | 5,055E-01 | 1140 | 3,821E-01 | 2400 | 6,900E-01 | 3900 | 1,473E-01 |
| 250 | < 1,0E-05 | 550 | 5,767E-01 | 850 | 4,955E-01 | 1150 | 3,827E-01 | 2450 | 6,949E-01 | 3950 | 1,180E-01 |
| 260 | < 1,0E-05 | 560 | 5,747E-01 | 860 | 4,857E-01 | 1160 | 3,835E-01 | 2500 | 7,000E-01 | 4000 | 1,000E-01 |
| 270 | < 1,0E-05 | 570 | 5,682E-01 | 870 | 4,796E-01 | 1170 | 3,845E-01 | 2550 | 7,022E-01 | 4050 | 8,913E-02 |
| 280 | < 1,0E-05 | 580 | 5,605E-01 | 880 | 4,735E-01 | 1180 | 3,858E-01 | 2600 | 7,044E-01 | 4100 | 9,550E-02 |
| 290 | < 1,0E-05 | 590 | 5,549E-01 | 890 | 4,636E-01 | 1190 | 3,875E-01 | 2650 | 7,000E-01 | 4150 | 1,000E-01 |
| 300 | < 1,0E-05 | 600 | 5,548E-01 | 900 | 4,585E-01 | 1200 | 3,900E-01 | 2700 | 6,600E-01 | 4200 | 1,000E-01 |
| 310 | < 1,0E-05 | 610 | 5,579E-01 | 910 | 4,487E-01 | 1250 | 4,075E-01 | 2750 | 3,108E-01 | 4250 | 9,441E-02 |
| 320 | 7,413E-04 | 620 | 5,602E-01 | 920 | 4,416E-01 | 1300 | 4,400E-01 | 2800 | 1,700E-01 | 4300 | 7,762E-02 |
| 330 | 1,600E-02 | 630 | 5,604E-01 | 930 | 4,364E-01 | 1350 | 4,676E-01 | 2850 | 1,583E-01 | 4350 | 5,495E-02 |
| 340 | 8,600E-02 | 640 | 5,578E-01 | 940 | 4,293E-01 | 1400 | 5,000E-01 | 2900 | 1,700E-01 | 4400 | 4,000E-02 |
| 350 | 2,050E-01 | 650 | 5,558E-01 | 950 | 4,220E-01 | 1450 | 5,321E-01 | 2950 | 1,935E-01 | 4450 | 2,512E-02 |
| 360 | 3,280E-01 | 660 | 5,576E-01 | 960 | 4,175E-01 | 1500 | 5,600E-01 | 3000 | 2,200E-01 | 4500 | 1,622E-02 |
| 370 | 4,012E-01 | 670 | 5,643E-01 | 970 | 4,104E-01 | 1550 | 5,761E-01 | 3050 | 2,485E-01 | 4550 | 1,000E-02 |
| 380 | 3,930E-01 | 680 | 5,773E-01 | 980 | 4,050E-01 | 1600 | 5,857E-01 | 3100 | 2,800E-01 | 4600 | 5,821E-03 |
| 390 | 5,000E-01 | 690 | 5,891E-01 | 990 | 4,022E-01 | 1650 | 5,900E-01 | 3150 | 3,057E-01 | 4650 | 3,192E-03 |
| 400 | 5,456E-01 | 700 | 5,993E-01 | 1000 | 3,974E-01 | 1700 | 5,900E-01 | 3200 | 3,364E-01 | 4700 | 1,820E-03 |
| 410 | 5,460E-01 | 710 | 6,038E-01 | 1010 | 3,941E-01 | 1750 | 5,930E-01 | 3250 | 3,628E-01 | 4750 | 1,038E-03 |
| 420 | 5,487E-01 | 720 | 6,035E-01 | 1020 | 3,900E-01 | 1800 | 5,952E-01 | 3300 | 3,700E-01 | 4800 | 6,561E-04 |
| 430 | 5,587E-01 | 730 | 6,003E-01 | 1030 | 3,870E-01 | 1850 | 6,000E-01 | 3350 | 3,511E-01 | 4850 | 3,981E-04 |
| 440 | 5,564E-01 | 740 | 5,948E-01 | 1040 | 3,850E-01 | 1900 | 6,100E-01 | 3400 | 2,900E-01 | 4900 | 2,104E-04 |
| 450 | 5,690E-01 | 750 | 5,873E-01 | 1050 | 3,830E-01 | 1950 | 6,194E-01 | 3450 | 2,170E-01 | 4950 | 1,079E-04 |
| 460 | 5,833E-01 | 760 | 5,797E-01 | 1060 | 3,800E-01 | 2000 | 6,300E-01 | 3500 | 1,500E-01 | 5000 | 3,917E-05 |
| 470 | 5,828E-01 | 770 | 5,707E-01 | 1070 | 3,790E-01 | 2050 | 6,414E-01 | 3550 | 1,012E-01 | 5050 | 1,503E-05 |
| 480 | 5,770E-01 | 780 | 5,610E-01 | 1080 | 3,770E-01 | 2100 | 6,500E-01 | 3600 | 7,000E-02 | 5100 | < 1,000E-05 |
| 490 | 5,715E-01 | 790 | 5,511E-01 | 1090 | 3,760E-01 | 2150 | 6,568E-01 | 3650 | 5,860E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## NG9

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,921 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | = | 0,025 | ± 0,01 |
| $\tau_i$ (546 nm) | = | 0,04 | ± 0,02 |
| $\tau_i$ (694 nm) | = | 0,08 | ± 0,02 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,515 | |
| $n_e$ (546 nm) | = | 1,511 | |
| $n_d$ (587,6 nm) | = | 1,509 | |
| **Sellmeier coefficients** | | | |
| valid from 440 nm to 1550 nm | | | |
| $B_1$ | | 0,7032 | |
| $B_2$ | | 0,5370 | |
| $B_3$ | | 30,3108 | |
| $C_1$ | | 1,067E-02 | µm² |
| $C_2$ | | 1,0492E-02 | µm² |
| $C_3$ | | 3524,129 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

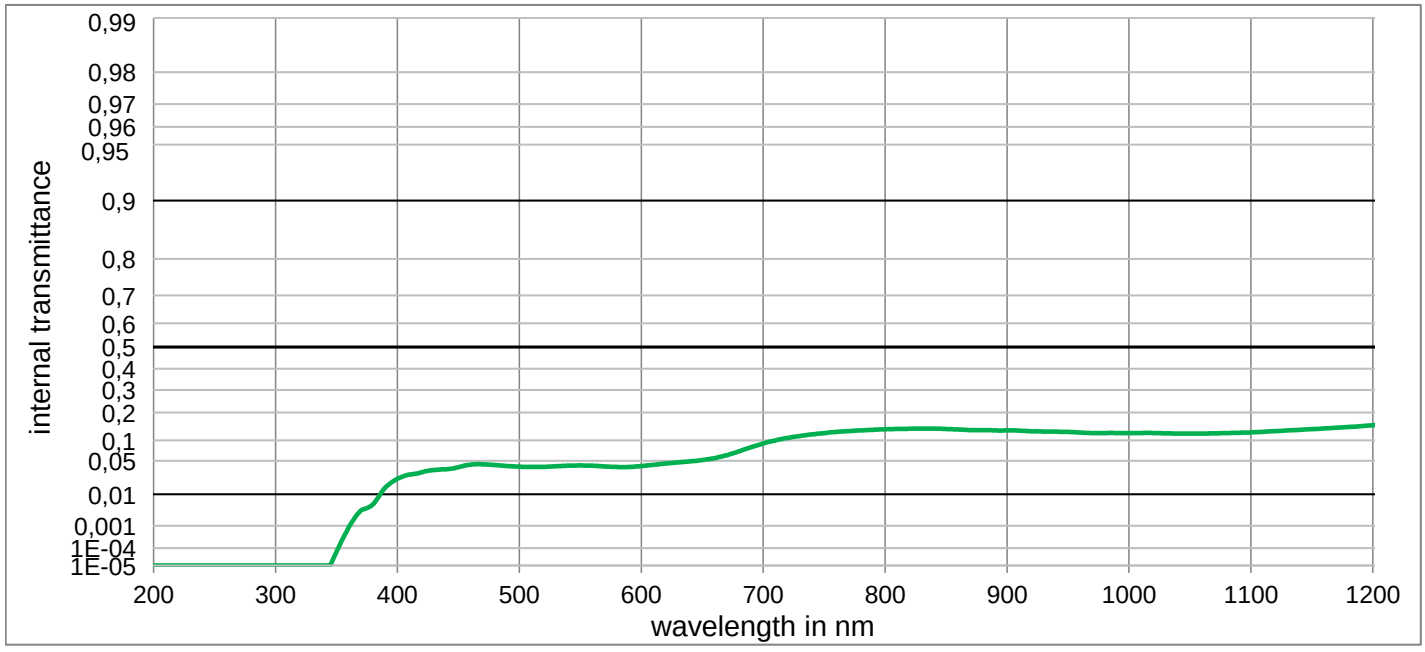
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = | 469 °C |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 6,5 |
| $\alpha_{(20°C/300°C)}$ | = | 7,0 |

| Chemical properties | | |
|---|---|---|
| **Chemical resistance** | | |
| FR class | = | 1 |
| SR class | = | 3.2 |
| AR class | = | 2 |
| **Resistance against humidity** | | |
| Resistant glass | | |
| see pocket catalogue "Optical Filter Glass 2020", chapter 5.5 | | |

| Colormetric properties | | | |
|---|---|---|---|
| | 1 mm | 2 mm | 3 mm |
| Illuminant D65 x | | | |
| Illuminant D65 y | | | |
| Illuminant D65 Y | | | |
| Illuminant D65 $\lambda_d$ | | | |
| Illuminant D65 $P_e$ | | | |
| Illuminant A x | | | |
| Illuminant A y | | | |
| Illuminant A Y | | | |
| Illuminant A $\lambda_d$ | | | |
| Illuminant A $P_e$ | | | |

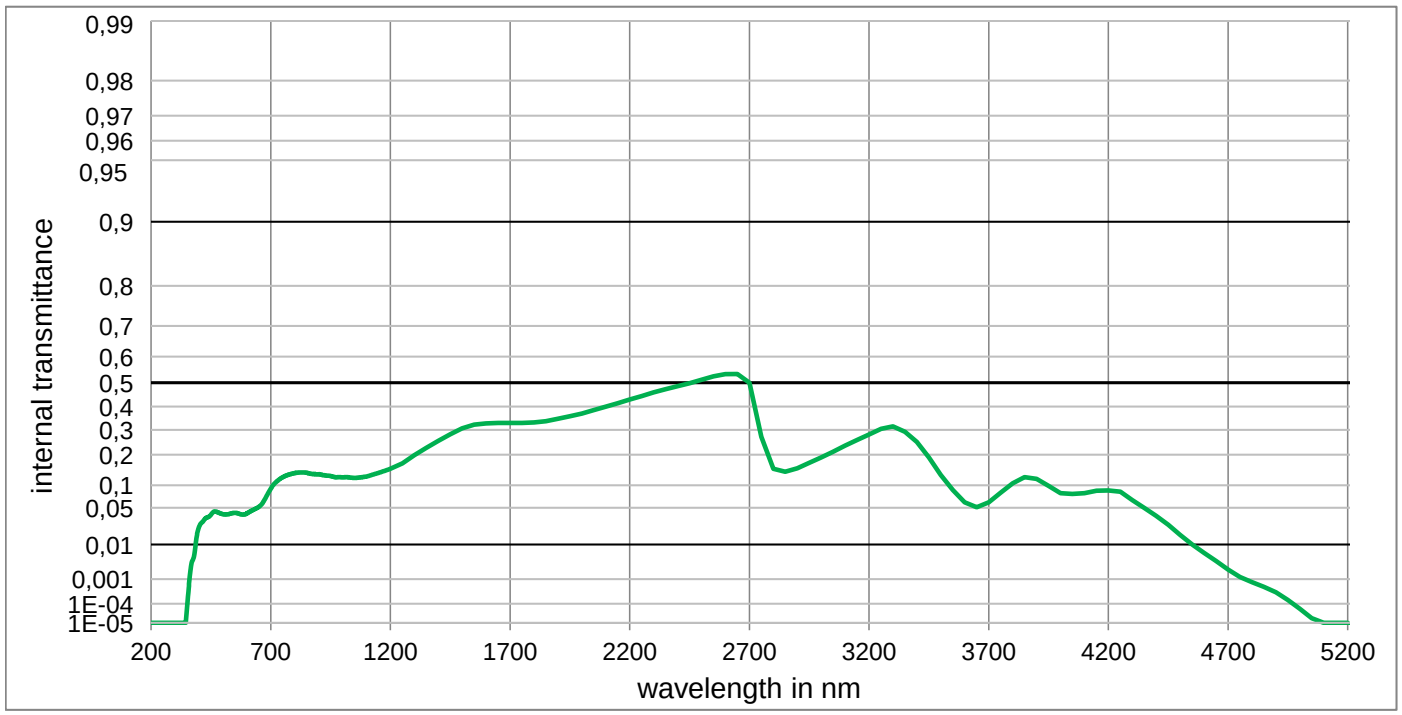
| Notes |
|---|
| Ionically colored glass |
| Neutral density filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## NG9




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 3,959E-02 | 800 | 1,359E-01 | 1100 | 1,250E-01 | 2200 | 4,300E-01 | 3700 | 6,000E-02 |
| 210 | < 1,0E-05 | 510 | 3,908E-02 | 810 | 1,369E-01 | 1110 | 1,273E-01 | 2250 | 4,442E-01 | 3750 | 8,100E-02 |
| 220 | < 1,0E-05 | 520 | 3,933E-02 | 820 | 1,376E-01 | 1120 | 1,295E-01 | 2300 | 4,600E-01 | 3800 | 1,055E-01 |
| 230 | < 1,0E-05 | 530 | 4,021E-02 | 830 | 1,381E-01 | 1130 | 1,318E-01 | 2350 | 4,731E-01 | 3850 | 1,231E-01 |
| 240 | < 1,0E-05 | 540 | 4,120E-02 | 840 | 1,377E-01 | 1140 | 1,340E-01 | 2400 | 4,857E-01 | 3900 | 1,181E-01 |
| 250 | < 1,0E-05 | 550 | 4,158E-02 | 850 | 1,368E-01 | 1150 | 1,364E-01 | 2450 | 4,982E-01 | 3950 | 9,860E-02 |
| 260 | < 1,0E-05 | 560 | 4,120E-02 | 860 | 1,350E-01 | 1160 | 1,389E-01 | 2500 | 5,120E-01 | 4000 | 8,000E-02 |
| 270 | < 1,0E-05 | 570 | 3,995E-02 | 870 | 1,330E-01 | 1170 | 1,414E-01 | 2550 | 5,259E-01 | 4050 | 7,810E-02 |
| 280 | < 1,0E-05 | 580 | 3,908E-02 | 880 | 1,325E-01 | 1180 | 1,440E-01 | 2600 | 5,340E-01 | 4100 | 8,000E-02 |
| 290 | < 1,0E-05 | 590 | 3,908E-02 | 890 | 1,319E-01 | 1190 | 1,469E-01 | 2650 | 5,347E-01 | 4150 | 8,590E-02 |
| 300 | < 1,0E-05 | 600 | 4,067E-02 | 900 | 1,320E-01 | 1200 | 1,501E-01 | 2700 | 5,000E-01 | 4200 | 8,650E-02 |
| 310 | < 1,0E-05 | 610 | 4,276E-02 | 910 | 1,310E-01 | 1250 | 1,686E-01 | 2750 | 2,710E-01 | 4250 | 8,356E-02 |
| 320 | < 1,000E-05 | 620 | 4,500E-02 | 920 | 1,290E-01 | 1300 | 1,980E-01 | 2800 | 1,500E-01 | 4300 | 6,457E-02 |
| 330 | < 1,000E-05 | 630 | 4,700E-02 | 930 | 1,280E-01 | 1350 | 2,268E-01 | 2850 | 1,404E-01 | 4350 | 4,966E-02 |
| 340 | < 1,000E-05 | 640 | 4,900E-02 | 940 | 1,280E-01 | 1400 | 2,538E-01 | 2900 | 1,514E-01 | 4400 | 3,698E-02 |
| 350 | 6,412E-05 | 650 | 5,159E-02 | 950 | 1,270E-01 | 1450 | 2,814E-01 | 2950 | 1,700E-01 | 4450 | 2,590E-02 |
| 360 | 8,472E-04 | 660 | 5,537E-02 | 960 | 1,246E-01 | 1500 | 3,060E-01 | 3000 | 1,900E-01 | 4500 | 1,637E-02 |
| 370 | 3,404E-03 | 670 | 6,155E-02 | 970 | 1,229E-01 | 1550 | 3,217E-01 | 3050 | 2,112E-01 | 4550 | 1,000E-02 |
| 380 | 5,284E-03 | 680 | 7,039E-02 | 980 | 1,231E-01 | 1600 | 3,273E-01 | 3100 | 2,347E-01 | 4600 | 6,223E-03 |
| 390 | 1,464E-02 | 690 | 8,100E-02 | 990 | 1,231E-01 | 1650 | 3,292E-01 | 3150 | 2,582E-01 | 4650 | 3,784E-03 |
| 400 | 2,301E-02 | 700 | 9,104E-02 | 1000 | 1,226E-01 | 1700 | 3,300E-01 | 3200 | 2,800E-01 | 4700 | 2,089E-03 |
| 410 | 2,795E-02 | 710 | 1,000E-01 | 1010 | 1,231E-01 | 1750 | 3,300E-01 | 3250 | 3,040E-01 | 4750 | 1,186E-03 |
| 420 | 3,108E-02 | 720 | 1,074E-01 | 1020 | 1,232E-01 | 1800 | 3,317E-01 | 3300 | 3,149E-01 | 4800 | 7,727E-04 |
| 430 | 3,435E-02 | 730 | 1,134E-01 | 1030 | 1,221E-01 | 1850 | 3,368E-01 | 3350 | 2,923E-01 | 4850 | 5,176E-04 |
| 440 | 3,555E-02 | 740 | 1,186E-01 | 1040 | 1,214E-01 | 1900 | 3,474E-01 | 3400 | 2,500E-01 | 4900 | 3,148E-04 |
| 450 | 3,872E-02 | 750 | 1,228E-01 | 1050 | 1,211E-01 | 1950 | 3,581E-01 | 3450 | 1,900E-01 | 4950 | 1,493E-04 |
| 460 | 4,308E-02 | 760 | 1,268E-01 | 1060 | 1,213E-01 | 2000 | 3,700E-01 | 3500 | 1,300E-01 | 5000 | 5,754E-05 |
| 470 | 4,356E-02 | 770 | 1,297E-01 | 1070 | 1,220E-01 | 2050 | 3,845E-01 | 3550 | 8,770E-02 | 5050 | 1,820E-05 |
| 480 | 4,231E-02 | 780 | 1,320E-01 | 1080 | 1,229E-01 | 2100 | 4,000E-01 | 3600 | 6,000E-02 | 5100 | < 1,000E-05 |
| 490 | 4,069E-02 | 790 | 1,340E-01 | 1090 | 1,240E-01 | 2150 | 4,140E-01 | 3650 | 5,110E-02 | 5150 | < 1,000E-05 |

# Data Sheet

## NG11

| Optical properties | | | |
|---|---|---|---|
| **Reflection factor** | | | |
| $P_d$ | = | 0,923 | |
| **Spectral values guaranteed** | | | |
| $\tau_i$ (405 nm) | = | 0,76 | ± 0,02 |
| $\tau_i$ (546 nm) | = | 0,77 | ± 0,02 |
| $\tau_i$ (694 nm) | = | 0,79 | ± 0,02 |
| **Refractive indices** | | | |
| $n_F$ (486 nm) | = | 1,504 | |
| $n_e$ (546 nm) | = | 1,5 | |
| $n_d$ (587,6 nm) | = | 1,499 | |
| **Sellmeier coefficients** | | | |
| valid from 365 nm to 1530 nm | | | |
| $B_1$ | | 1,1839 | |
| $B_2$ | | 0,0336 | |
| $B_3$ | | 1,1111 | |
| $C_1$ | | 7,634E-03 | µm² |
| $C_2$ | | 4,3272E-02 | µm² |
| $C_3$ | | 116,448 | µm² |
| **Internal quality** | | | |
| Bubble class | | 2 | |

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

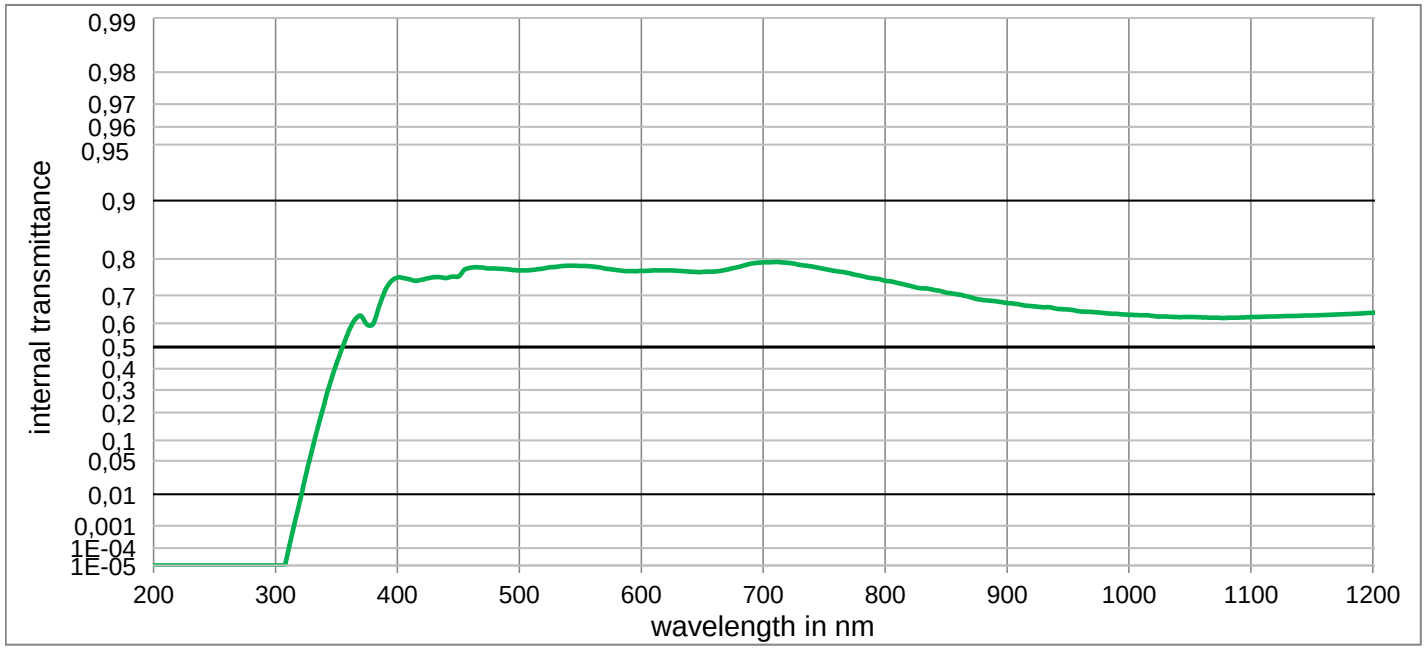
| Thermal properties | | |
|---|---|---|
| **Transformation temperature** | | |
| Tg | = | 481 °C |
| **Thermal expansion in** | | **$10^{-6}$/K** |
| $\alpha_{(-30°C/+70°C)}$ | = | 6,7 |
| $\alpha_{(20°C/300°C)}$ | = | 7,2 |
| $\alpha_{(20°C/200°C)}$ | = | 7 |

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

| Colormetric properties | | 1 mm | 2 mm | 3 mm |
|---|---|---|---|---|
| Illuminant D65 | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |
| Illuminant A | x | | | |
| | y | | | |
| | Y | | | |
| | $\lambda_d$ | | | |
| | $P_e$ | | | |

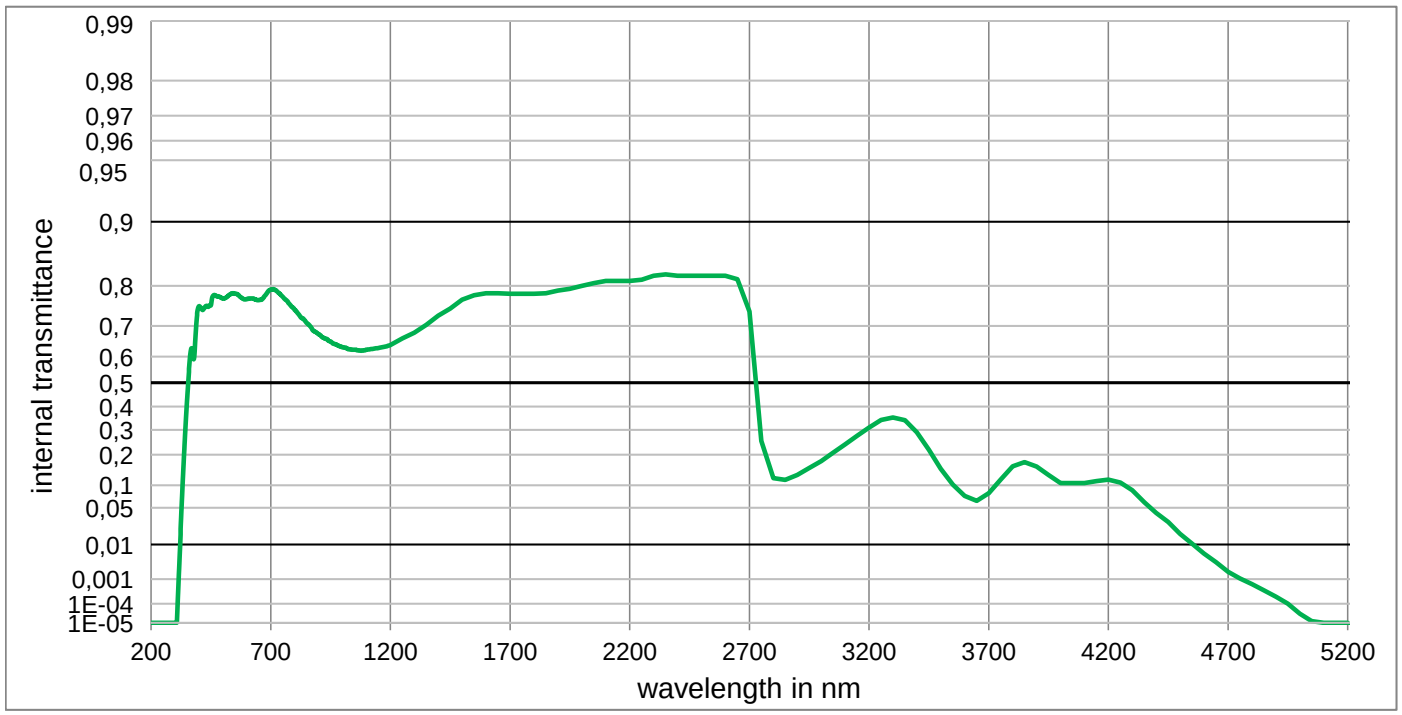
| Notes |
|---|
| |
| Ionically colored glass |
| Neutral density filter |
| |
| |
| DIN 58131 |
| |

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



# Data Sheet

## NG11




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

| λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ | λ /nm | $\tau_i$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | < 1,0E-05 | 500 | 7,720E-01 | 800 | 7,440E-01 | 1100 | 6,240E-01 | 2200 | 8,100E-01 | 3700 | 8,000E-02 |
| 210 | < 1,0E-05 | 510 | 7,730E-01 | 810 | 7,380E-01 | 1110 | 6,254E-01 | 2250 | 8,124E-01 | 3750 | 1,159E-01 |
| 220 | < 1,0E-05 | 520 | 7,770E-01 | 820 | 7,300E-01 | 1120 | 6,266E-01 | 2300 | 8,200E-01 | 3800 | 1,583E-01 |
| 230 | < 1,0E-05 | 530 | 7,810E-01 | 830 | 7,220E-01 | 1130 | 6,278E-01 | 2350 | 8,227E-01 | 3850 | 1,725E-01 |
| 240 | < 1,0E-05 | 540 | 7,840E-01 | 840 | 7,170E-01 | 1140 | 6,290E-01 | 2400 | 8,200E-01 | 3900 | 1,574E-01 |
| 250 | < 1,0E-05 | 550 | 7,830E-01 | 850 | 7,090E-01 | 1150 | 6,304E-01 | 2450 | 8,200E-01 | 3950 | 1,300E-01 |
| 260 | < 1,0E-05 | 560 | 7,820E-01 | 860 | 7,030E-01 | 1160 | 6,318E-01 | 2500 | 8,200E-01 | 4000 | 1,060E-01 |
| 270 | < 1,0E-05 | 570 | 7,770E-01 | 870 | 6,940E-01 | 1170 | 6,335E-01 | 2550 | 8,200E-01 | 4050 | 1,060E-01 |
| 280 | < 1,0E-05 | 580 | 7,730E-01 | 880 | 6,850E-01 | 1180 | 6,353E-01 | 2600 | 8,200E-01 | 4100 | 1,058E-01 |
| 290 | < 1,0E-05 | 590 | 7,700E-01 | 890 | 6,810E-01 | 1190 | 6,375E-01 | 2650 | 8,133E-01 | 4150 | 1,117E-01 |
| 300 | < 1,0E-05 | 600 | 7,710E-01 | 900 | 6,750E-01 | 1200 | 6,400E-01 | 2700 | 7,400E-01 | 4200 | 1,162E-01 |
| 310 | 5,1E-05 | 610 | 7,720E-01 | 910 | 6,700E-01 | 1250 | 6,616E-01 | 2750 | 2,545E-01 | 4250 | 1,072E-01 |
| 320 | 6,622E-03 | 620 | 7,720E-01 | 920 | 6,640E-01 | 1300 | 6,800E-01 | 2800 | 1,200E-01 | 4300 | 8,710E-02 |
| 330 | 7,396E-02 | 630 | 7,710E-01 | 930 | 6,600E-01 | 1350 | 7,030E-01 | 2850 | 1,150E-01 | 4350 | 6,012E-02 |
| 340 | 2,387E-01 | 640 | 7,690E-01 | 940 | 6,550E-01 | 1400 | 7,285E-01 | 2900 | 1,300E-01 | 4400 | 4,169E-02 |
| 350 | 4,241E-01 | 650 | 7,680E-01 | 950 | 6,520E-01 | 1450 | 7,473E-01 | 2950 | 1,527E-01 | 4450 | 2,904E-02 |
| 360 | 5,667E-01 | 660 | 7,690E-01 | 960 | 6,450E-01 | 1500 | 7,690E-01 | 3000 | 1,762E-01 | 4500 | 1,720E-02 |
| 370 | 6,290E-01 | 670 | 7,740E-01 | 970 | 6,430E-01 | 1550 | 7,794E-01 | 3050 | 2,073E-01 | 4550 | 1,038E-02 |
| 380 | 5,968E-01 | 680 | 7,810E-01 | 980 | 6,390E-01 | 1600 | 7,841E-01 | 3100 | 2,400E-01 | 4600 | 6,000E-03 |
| 390 | 7,166E-01 | 690 | 7,890E-01 | 990 | 6,360E-01 | 1650 | 7,841E-01 | 3150 | 2,752E-01 | 4650 | 3,459E-03 |
| 400 | 7,530E-01 | 700 | 7,920E-01 | 1000 | 6,330E-01 | 1700 | 7,831E-01 | 3200 | 3,091E-01 | 4700 | 1,778E-03 |
| 410 | 7,480E-01 | 710 | 7,930E-01 | 1010 | 6,310E-01 | 1750 | 7,831E-01 | 3250 | 3,421E-01 | 4750 | 1,052E-03 |
| 420 | 7,470E-01 | 720 | 7,910E-01 | 1020 | 6,280E-01 | 1800 | 7,831E-01 | 3300 | 3,525E-01 | 4800 | 6,607E-04 |
| 430 | 7,540E-01 | 730 | 7,860E-01 | 1030 | 6,260E-01 | 1850 | 7,841E-01 | 3350 | 3,412E-01 | 4850 | 3,846E-04 |
| 440 | 7,520E-01 | 740 | 7,820E-01 | 1040 | 6,240E-01 | 1900 | 7,900E-01 | 3400 | 2,900E-01 | 4900 | 2,089E-04 |
| 450 | 7,559E-01 | 750 | 7,760E-01 | 1050 | 6,240E-01 | 1950 | 7,935E-01 | 3450 | 2,186E-01 | 4950 | 1,007E-04 |
| 460 | 7,790E-01 | 760 | 7,700E-01 | 1060 | 6,230E-01 | 2000 | 8,000E-01 | 3500 | 1,500E-01 | 5000 | 3,236E-05 |
| 470 | 7,790E-01 | 770 | 7,650E-01 | 1070 | 6,220E-01 | 2050 | 8,058E-01 | 3550 | 1,018E-01 | 5050 | 1,271E-05 |
| 480 | 7,770E-01 | 780 | 7,580E-01 | 1080 | 6,210E-01 | 2100 | 8,100E-01 | 3600 | 7,350E-02 | 5100 | < 1,000E-05 |
| 490 | 7,750E-01 | 790 | 7,510E-01 | 1090 | 6,220E-01 | 2150 | 8,100E-01 | 3650 | 6,310E-02 | 5150 | < 1,000E-05 |

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