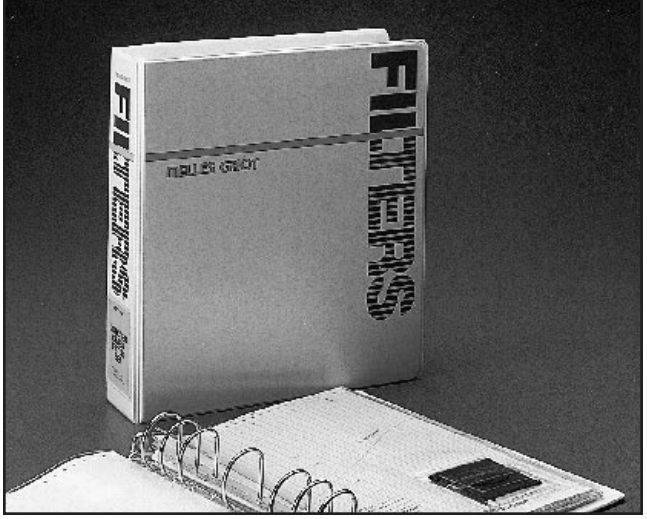


Available in:
✔ **Production Quantities**
✔ **Custom Sizes**

Colored Glass Filters

The colored glass filters in this catalog are made from the highest quality Schott colored filter glass. The spectral properties of these filters are uniform over their entire aperture and are invariant with time at temperatures below 250°C (482°F).

- Spectral properties are insensitive to the angle of incidence.
- All colored glass filters come with individual spectrophotometer curves and are shipped in protective vinyl pages.

APPLICATION NOTE

Transmittance Curve Interpretation

At any specific wavelength the external transmittance, T, of a colored glass filter is given by the approximate formula

$$T = t_1 t_2 T_i$$

where t_1 is the transmittance of the first air-glass interface, t_2 is the transmittance of the second air-glass interface, and T_i is the internal transmittance. This formula neglects possible multiple reflections that may occur between interfaces. The interface transmittances t_1 and t_2 are equal, and their product $t_1 t_2$ is called the correction factor. The correction factor is related to the refractive index n of the glass by

$$t_1 t_2 = 1 - 2\left(\frac{n-1}{n+1}\right)^2 + \left(\frac{n-1}{n+1}\right)^4 .$$

The nominal filter transmittance curves shown in this chapter are graphs of internal transmittance versus wavelength for a thickness of 3 mm. This is the thickness of our standard filters. Thus the curves neglect all effects of reflections at the air-glass interfaces such as the reflectance dependence on angle. Values of the correction factor are also given; these can be used to determine nominal external transmittance. Minimal internal transmittance graphs have been included in this catalog to calculate nominal external transmittance at nonstandard thicknesses.

SPECIFICATIONS: COLORED GLASS FILTERS

Spectral Curves:
Spectrophotometer curves are supplied with each filter. Accuracy of transmittance curves is 2% of full scale.

Dimensions:
Diameter: 25.0 +0, −0.15 mm
Square: 50.8 mm × 50.8 mm (±0.2 mm)

Thickness: 3.0 mm ±0.25 mm

Parallelism: 2 arc minutes

Material: Schott colored glass

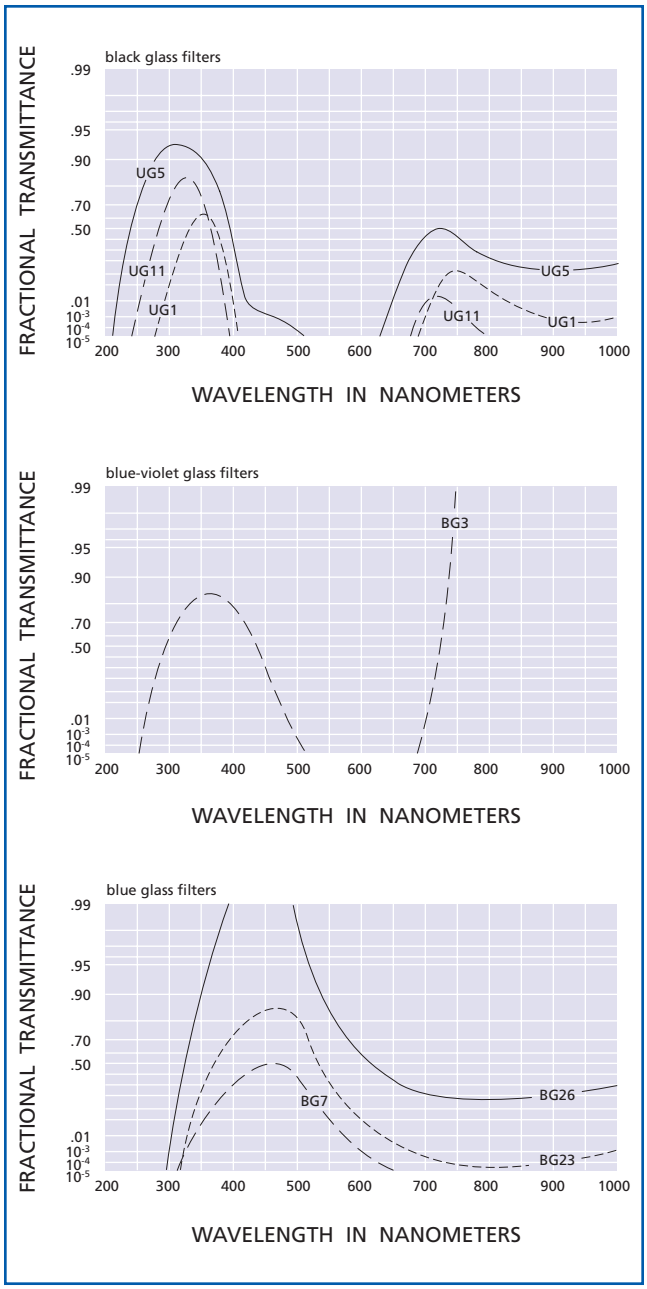
Surface Quality: Pitch polished, 80-50 scratch and dig

Melt-to-Melt Transmittance Variation:
±7.0 nm deviation for sharp cut on filters

Suggested Maximum Operating Temperature:
250°C (482°F). Irreversible transmittance changes may occur at higher temperatures.

Identification:
Each filter is marked with the last three digits of its product number.

Packaging:
Each filter with its curve is packaged in a protective vinyl binder page. Binders are also available separately.



Typical internal transmittance curves for 3.0-mm glass thickness

UV-Transmitting Black Glass Filters

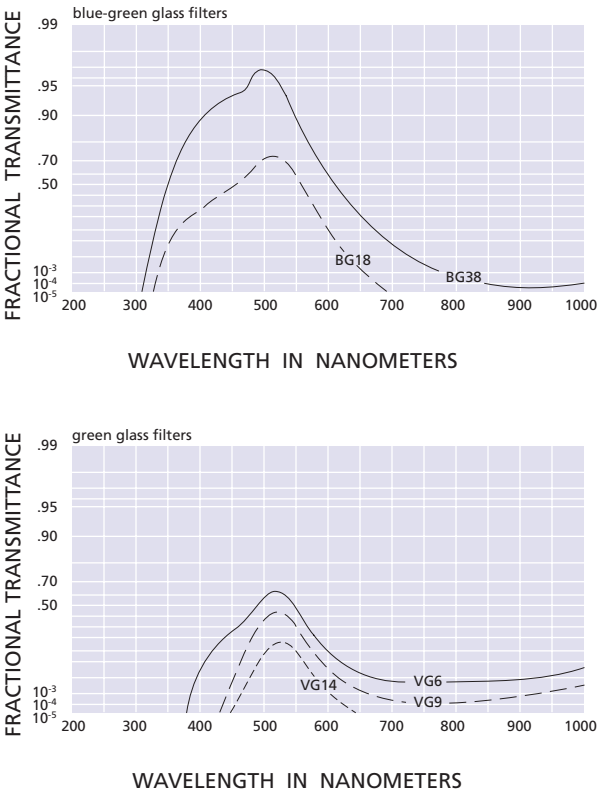
Schott Glass Type	Correction Factor ($t_1 t_2$)	Size (mm)	PRODUCT NUMBER
UG 5	0.91	ϕ25.0	03 FCG 577
	0.91	50.8 × 50.8	03 FCG 177
UG 11	0.91	ϕ25.0	03 FCG 579
	0.91	50.8 × 50.8	03 FCG 179
UG 1	0.91	ϕ25.0	03 FCG 401
	0.91	50.8 × 50.8	03 FCG 001

UV- and Red-Transmitting Blue-Violet Glass Filters

Schott Glass Type	Correction Factor ($t_1 t_2$)	Size (mm)	PRODUCT NUMBER
BG 3	0.92	ϕ25.0	03 FCG 409
	0.92	50.8 × 50.8	03 FCG 009

Red-Absorbing Blue Glass Filters

Schott Glass Type	Correction Factor ($t_1 t_2$)	Size (mm)	PRODUCT NUMBER
BG 7	0.92	ϕ25.0	03 FCG 411
	0.92	50.8 × 50.8	03 FCG 011
BG 26	0.92	ϕ25.0	03 FCG 423
	0.92	50.8 × 50.8	03 FCG 023
BG 23	0.92	ϕ25.0	03 FCG 419
	0.92	50.8 × 50.8	03 FCG 019



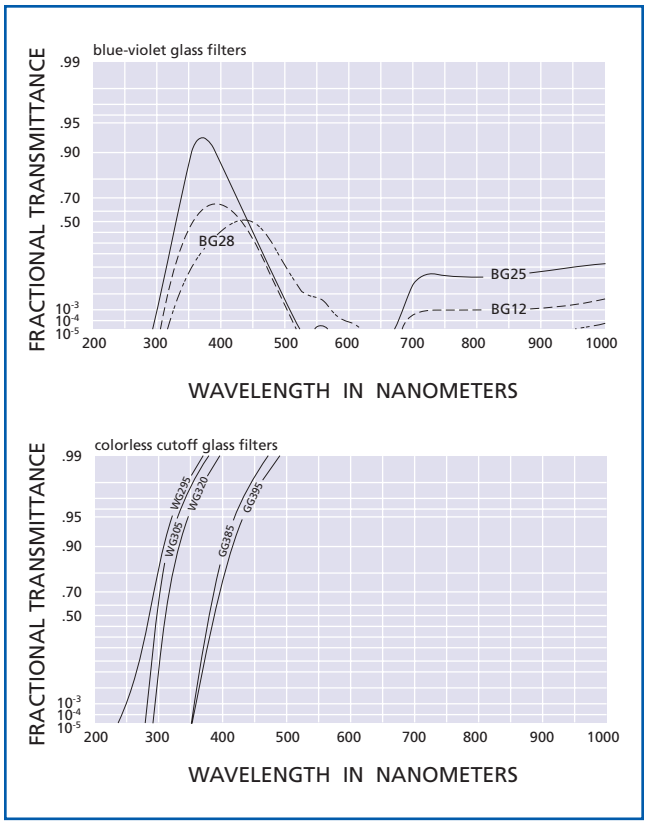
Typical internal transmittance curves for 3.0-mm glass thickness

Red-Absorbing Blue-Green Glass Filters

Schott Glass Type	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
BG 38	0.915	ϕ25.0	03 FCG 433
	0.915	50.8 × 50.8	03 FCG 033
BG 18	0.91	ϕ25.0	03 FCG 414
	0.91	50.8 × 50.8	03 FCG 014

Green Glass Filters

Schott Glass Type	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
VG 6	0.91	ϕ25.0	03 FCG 439
	0.91	50.8 × 50.8	03 FCG 039
VG 9	0.91	ϕ25.0	03 FCG 441
	0.91	50.8 × 50.8	03 FCG 041
VG 14	0.91	ϕ25.0	03 FCG 445
	0.91	50.8 × 50.8	03 FCG 045



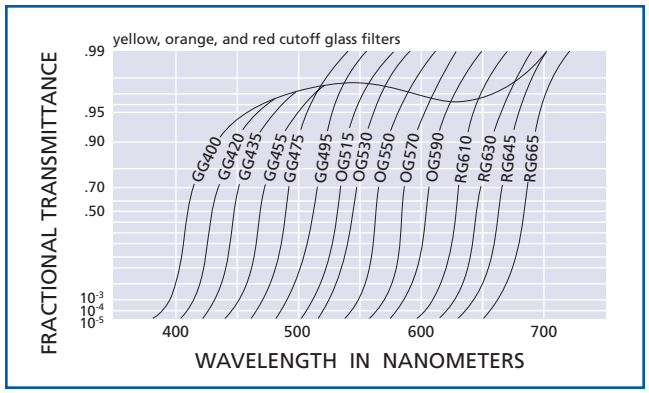
Typical internal transmittance curves for 3.0 mm glass thickness

Red-Absorbing Blue-Violet Glass Filters

Schott Glass Type	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
BG 25	0.92	ϕ25.0	03 FCG 421
	0.92	50.8 × 50.8	03 FCG 021
BG 12	0.92	ϕ25.0	03 FCG 413
	0.92	50.8 × 50.8	03 FCG 013
BG 28	0.92	ϕ25.0	03 FCG 425
	0.92	50.8 × 50.8	03 FCG 025

Colorless Sharp Cutoff Glass Filters

Schott Glass Type	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
WG 295	0.92	ϕ25.0	03 FCG 519
	0.92	50.8 × 50.8	03 FCG 119
WG 305	0.92	ϕ25.0	03 FCG 521
	0.92	50.8 × 50.8	03 FCG 121
WG 320	0.91	ϕ25.0	03 FCG 523
	0.91	50.8 × 50.8	03 FCG 123
GG 385	0.905	ϕ25.0	03 FCG 449
	0.905	50.8 × 50.8	03 FCG 049
GG 395	0.895	ϕ25.0	03 FCG 455
	0.895	50.8 × 50.8	03 FCG 055



Typical internal transmittance curves for 3.0-mm glass thickness

APPLICATION NOTE

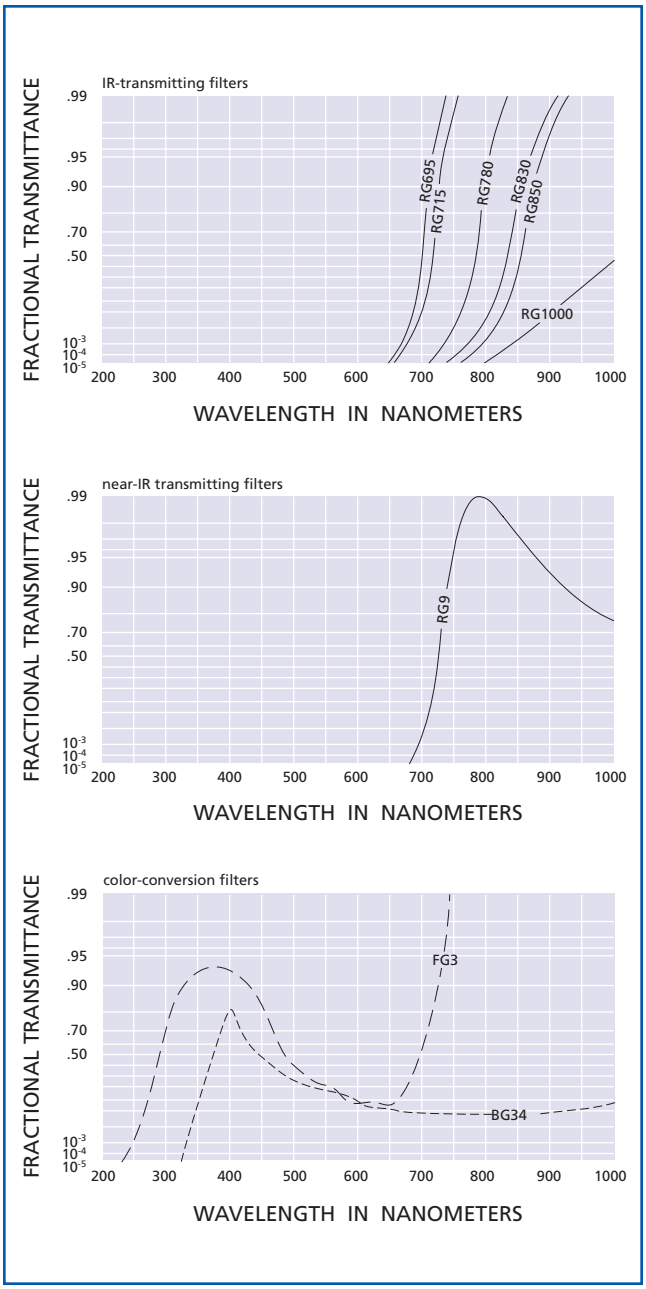
Temperature Dependence of Cutoff FIlters

Sharp cutoff glasses exhibit a reversible shift of the absorption edge position (of which the half-power point is a convenient indicator) as the temperature is increased. The shift, roughly constant over the range from 10° to 90°C, is tabulated (for sharp cutoff filters only) in nm/°C under the heading $\Delta\lambda/\Delta T$. The shift is in the direction of longer wavelengths as the temperature is increased.

Yellow, Orange, and Red Sharp Cutoff Glass Filters

Schott Glass Type	$\Delta\lambda/\Delta T$*	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
GG 400	0.07	0.91	ϕ25.0	03 FCG 457
	0.07	0.91	50.8 × 50.8	03 FCG 057
GG 420	0.07	0.91	ϕ25.0	03 FCG 459
	0.07	0.91	50.8 × 50.8	03 FCG 059
GG 435	0.07	0.91	ϕ25.0	03 FCG 461
	0.07	0.91	50.8 × 50.8	03 FCG 061
GG 455	0.08	0.915	ϕ25.0	03 FCG 463
	0.08	0.915	50.8 × 50.8	03 FCG 063
GG 475	0.09	0.915	ϕ25.0	03 FCG 465
	0.09	0.915	50.8 × 50.8	03 FCG 065
GG 495	0.10	0.915	ϕ25.0	03 FCG 467
	0.10	0.915	50.8 × 50.8	03 FCG 067
OG 515	0.11	0.915	ϕ25.0	03 FCG 483
	0.11	0.915	50.8 × 50.8	03 FCG 083
OG 530	0.12	0.915	ϕ25.0	03 FCG 485
	0.12	0.915	50.8 × 50.8	03 FCG 085
OG 550	0.13	0.915	ϕ25.0	03 FCG 487
	0.13	0.915	50.8 × 50.8	03 FCG 087
OG 570	0.14	0.915	ϕ25.0	03 FCG 489
	0.14	0.915	50.8 × 50.8	03 FCG 089
OG 590	0.15	0.915	ϕ25.0	03 FCG 498
	0.15	0.915	50.8 × 50.8	03 FCG 098
RG 610	0.16	0.915	ϕ25.0	03 FCG 501
	0.16	0.915	50.8 × 50.8	03 FCG 101
RG 630	0.17	0.915	ϕ25.0	03 FCG 503
	0.17	0.915	50.8 × 50.8	03 FCG 103
RG 645	0.17	0.915	ϕ25.0	03 FCG 505
	0.17	0.915	50.8 × 50.8	03 FCG 105
RG 665	0.17	0.915	ϕ25.0	03 FCG 507
	0.17	0.915	50.8 × 50.8	03 FCG 107

**$\Delta\lambda/\Delta T$ is the temperature coefficient of half-power point position shift in nm/°C see application note.*



Typical internal transmittance curves for 3.0-mm glass thickness

IR-Transmitting Black Glass Filters

Schott Glass Type	$\Delta\lambda/\Delta T$*	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
RG695	0.18	0.915	ϕ25.0	03 FCG 509
	0.18	0.915	50.8 × 50.8	03 FCG 109
RG715	0.18	0.915	ϕ25.0	03 FCG 511
	0.18	0.915	50.8 × 50.8	03 FCG 111
RG780	0.22	0.915	ϕ25.0	03 FCG 512
	0.22	0.915	50.8 × 50.8	03 FCG 112
RG830	0.28	0.915	ϕ25.0	03 FCG 514
	0.28	0.915	50.8 × 50.8	03 FCG 114
RG850	0.30	0.915	ϕ25.0	03 FCG 518
	0.30	0.915	50.8 × 50.8	03 FCG 118
RG1000	0.18	0.915	ϕ25.0	03 FCG 513
	0.18	0.915	50.8 × 50.8	03 FCG 113

**$\Delta\lambda/\Delta T$ is the temperature coefficient of half-power point position shift in nm/°C. Refer to application note on page 13.7.*

Near-IR-Transmitting Black Glass Filters

Schott Glass Type	$\Delta\lambda/\Delta T$*	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
RG9	0.07	0.915	ϕ25.0	03 FCG 515
	0.07	0.915	50.8 × 50.8	03 FCG 115

**$\Delta\lambda/\Delta T$ is the temperature coefficient of half-power point position shift in nm/°C. Refer to application note on page 13.7.*

Blue-Tinted Glass Filters for Color Conversion

Schott Glass Type	Correction Factor (t_1t_2)	Size (mm)	PRODUCT NUMBER
FG3	0.925	ϕ25.0	03 FCG 539
	0.925	50.8 × 50.8	03 FCG 139
BG34	0.90	ϕ25.0	03 FCG 427
	0.90	50.8 × 50.8	03 FCG 027