

Optical filters for light sources

Colored glass filters

Colored glass filters are unique in their ability to transmit a very broad band of light. They are used for order sorting, light attenuation and spectral selection of a broadband source. The long wave pass type, often used as order/wavelength sorting filters, transmit the longer wavelengths and absorb the shorter wavelengths. The bandpass type, useful for enhancing the signal-to-noise ratio of illumination systems, transmit a broad band of energy while blocking the shorter and longer wavelengths. As with all optical components, colored glass filters should not be exposed to high temperatures or sharp temperature changes.

Combining filters

You can combine several filters to increase the attenuation or change the band pass. Stack a long pass and a short pass filter; the transmittance of the two filters at any wavelength will be the product of the transmittance of the individual filters at that wavelength.

The transmittance curves on the following pages do not include the surface reflection losses. They show the internal transmittance. The reflectance is about 0,04 for a typical colored glass in air. So the total reflection loss for two surfaces is approximately 0.08 or 8%.

Note: If the bandpass filter transmits the signal and the radiation transmitted outside the bandpass is "noise", then the signal to noise ratio can often be improved by using several filters of the same type.

Example

The UG1 filter has a transmittance of 0,65 at 360 nm (signal wavelength) and 0,015 at 750 nm (noise wavelength), giving a $0,65/0,015 = 43,3:1$ contribution to signal-to-noise-ratio. Two filters have a transmittance of 0.42 at 360 nm and 0.000225 at 750 nm for the much greater 1866:1 contribution to signal to noise ratio.

Our open filter holders are convenient mounts for holding "stacked" filters up to a total thickness of 19 mm.

Power handling

These colored glass filters attenuate by absorption. Attenuation of a small, high power beam results in extreme localized heating, and will likely rupture the filter.



General recommendations:

- Do not exceed a 5° C/min. temperature rise (maximum temperature is 100° C).
- Spread the beam over the entire surface of the filter.
- Use a holder which minimizes thermal and mechanical stress.

Bandpass type

UG Ultraviolet transmitting
BG Blue and blue-green

Heat absorbing type

KG Infrared absorbing

Long wave pass type

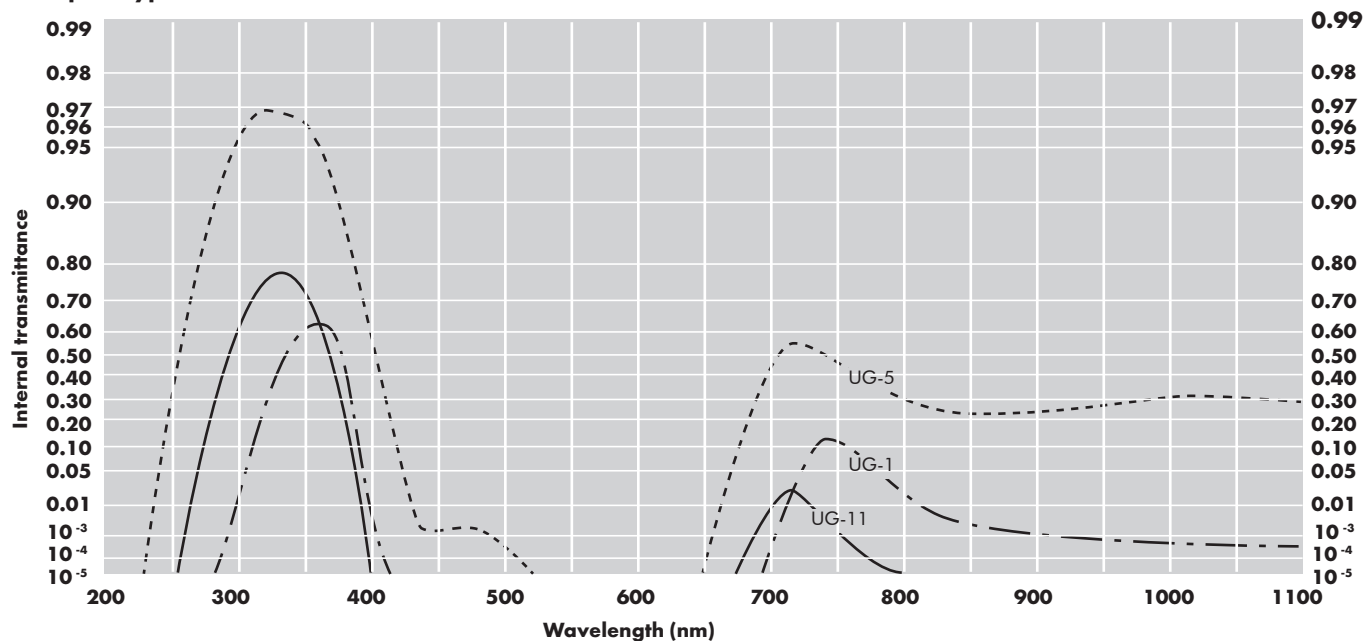
RG Near infrared transmitting
GG Yellow
OG Orange
WG Ultraviolet transmitting





Specifications	
Material	Schott glass
Optical thickness	3 mm ±0.5 mm
Mechanical thickness	Add 0.8 mm for ring mount
Size tolerance	+0.00/-0.25 mm
Surface quality	80/50 per MIL-M-13508
Max. operating temperature	+100° C
Flatness	1/4 wave per inch
Parallelism	30 arc seconds or better
Spectral data	Stated as internal transmittance
Note: Corners are cropped on all 165 mm sq. parts unless otherwise requested.	

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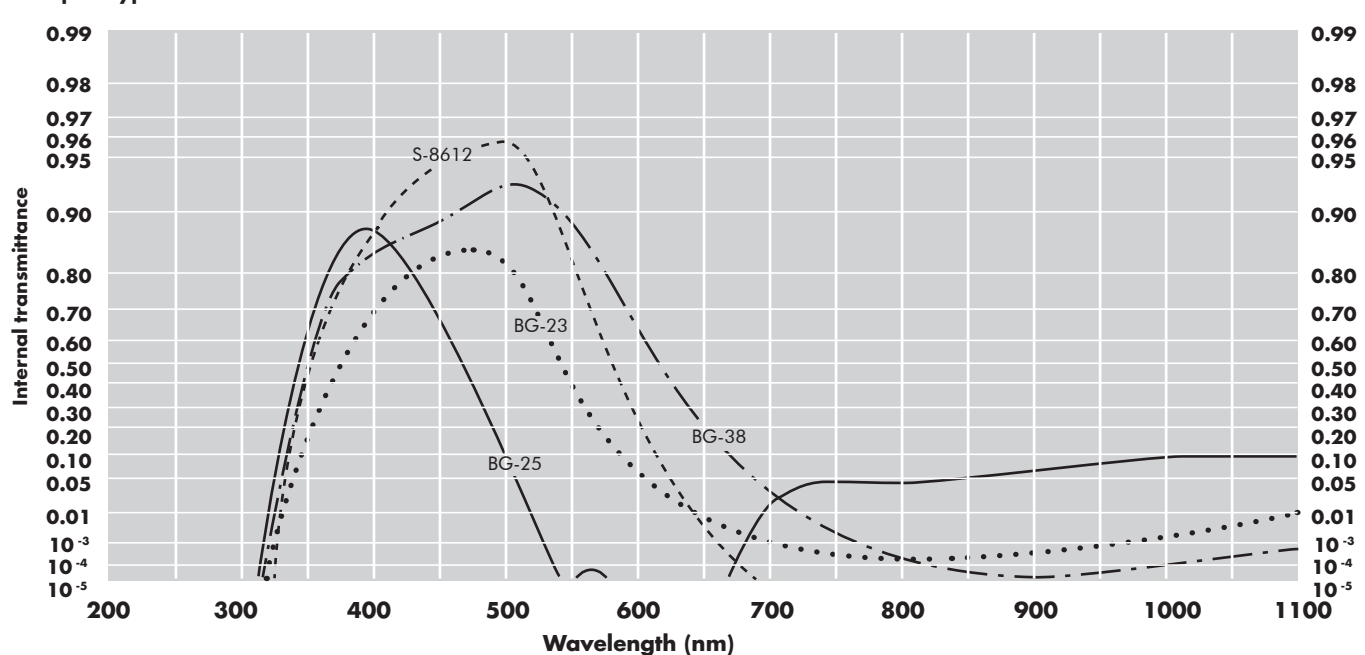
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Bandpass type



Glass type	Size, shape & part number			
	25 mm Ø 	50 mm Ø 	50 mm SQ 	165 mm SQ 
UG-1	001FG09-25	001FG09-50	001FG09-50S	001FG09-165S
UG-5	005FG09-25	005FG09-50	005FG09-50S	005FG09-165S
UG-11	011FG09-25	011FG09-50	011FG09-50S	011FG09-165S
BG-23	023FG11-25	023FG11-50	023FG11-50S	023FG11-165S
BG-25	025FG11-25	025FG11-50	025FG11-50S	025FG11-165S
BG-38	038FG11-25	038FG11-50	038FG11-50S	038FG11-165S
S-8612	S86FG11-25	S86FG11-50	S86FG11-50S	S86FG11-165S

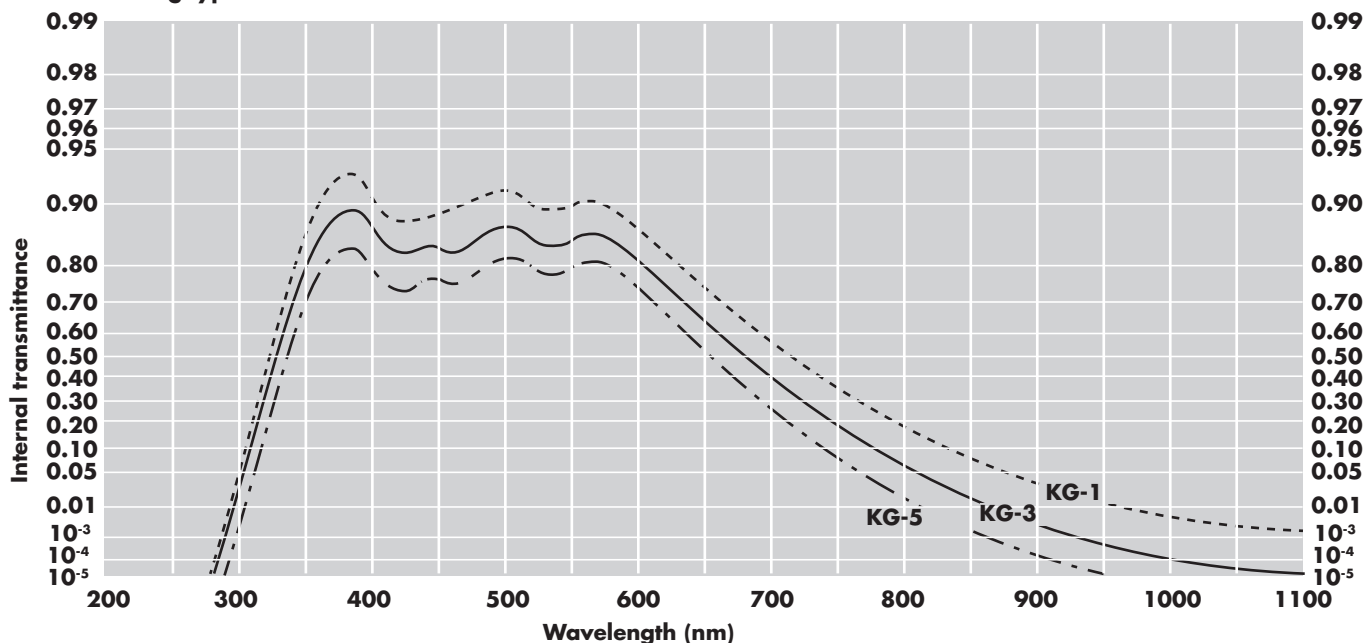
Bandpass type



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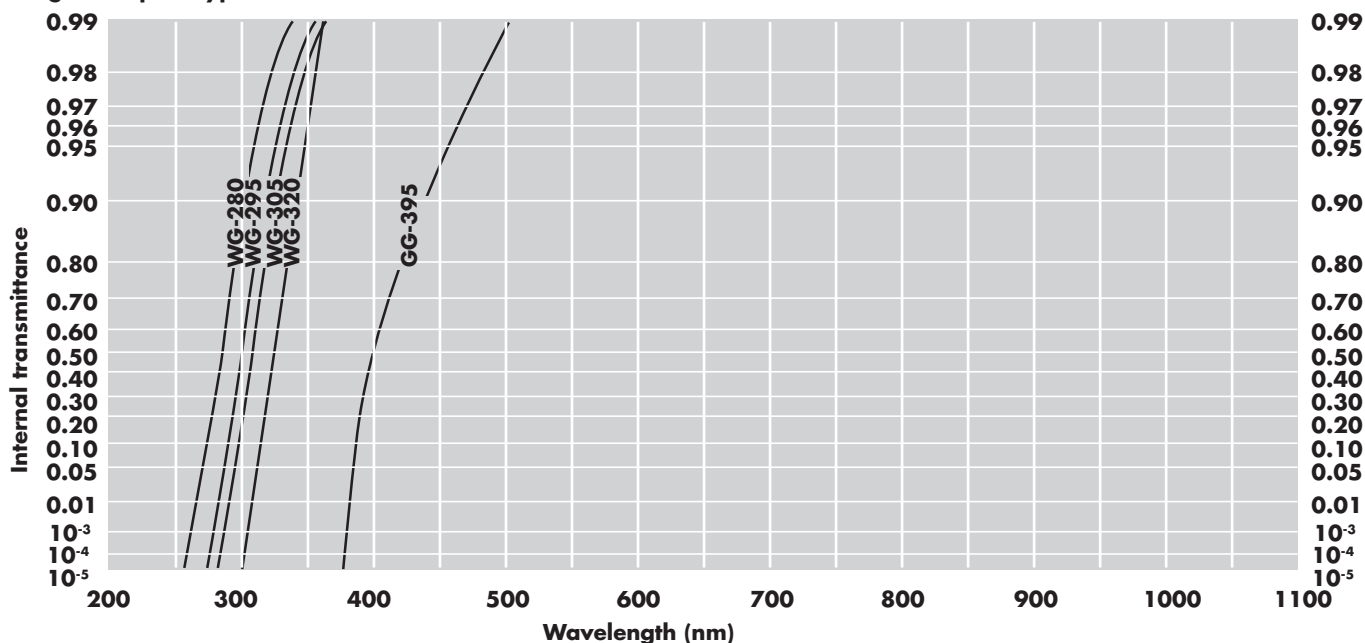
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Heat absorbing type



Glass type	Size, shape & part number			
	25 mm Ø ○	50 mm Ø ○	50 mm SQ □	165 mm SQ □
KG-1	001FG13-25	001FG13-50	001FG13-50S	001FG13-165S
KG-3	003FG13-25	003FG13-50	003FG13-50S	003FG13-165S
KG-5	005FG13-25	005FG13-50	005FG13-50S	005FG13-165S
WG-280	280FG01-25	280FG01-50	280FG01-50S	280FG01-165S
WG-295	295FG01-25	295FG01-50	295FG01-50S	295FG01-165S
WG-305	305FG01-25	305FG01-50	305FG01-50S	305FG01-165S
WG-320	320FG01-25	320FG01-50	320FG01-50S	320FG01-165S
GG-395	395FG03-25	395FG03-50	395FG03-50S	395FG03-165S

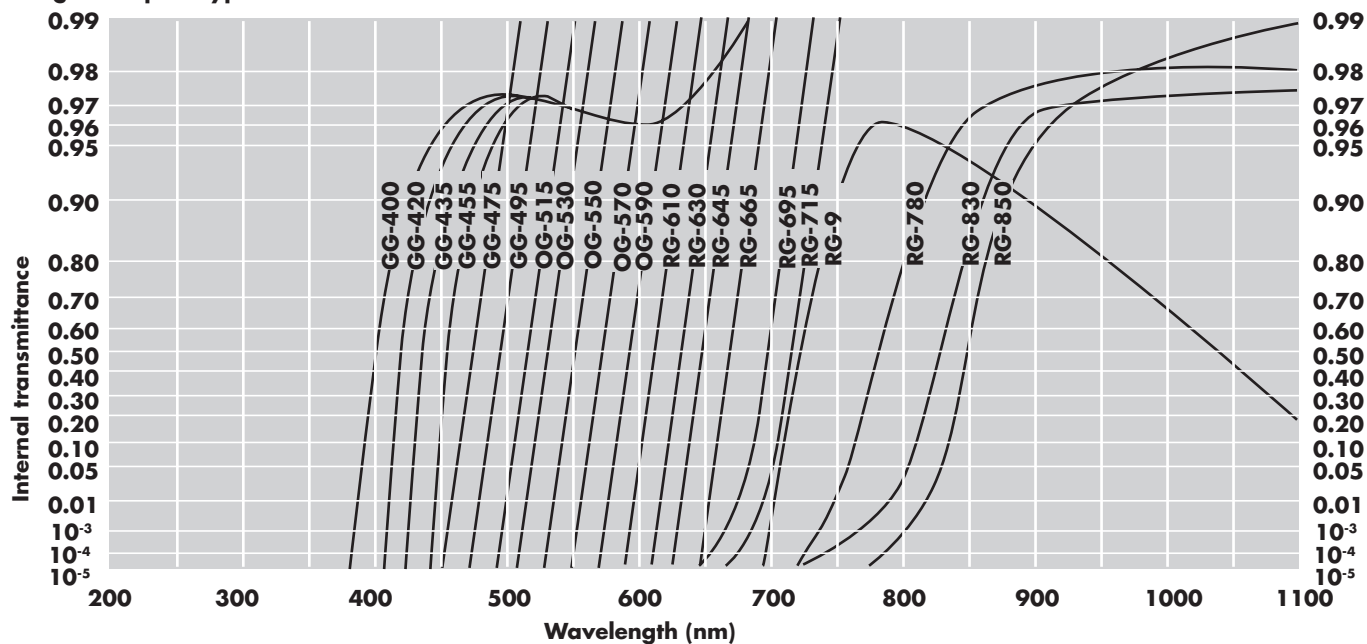
Long wave pass type



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Long wave pass type



Glass type	Size, shape & part number			
	25 mm Ø ○	50 mm Ø ○	50 mm SQ □	165 mm SQ □
GG-400	400FG03-25	400FG03-50	400FG03-50S	400FG03-165S
GG-420	420FG03-25	420FG03-50	420FG03-50S	420FG03-165S
GG-435	435FG03-25	435FG03-50	435FG03-50S	435FG03-165S
GG-455	455FG03-25	455FG03-50	455FG03-50S	455FG03-165S
GG-475	475FG03-25	475FG03-50	475FG03-50S	475FG03-165S
GG-495	495FG03-25	495FG03-50	495FG03-50S	495FG03-165S
OG-515	515FG05-25	515FG05-50	515FG05-50S	515FG05-165S
OG-530	530FG05-25	530FG05-50	530FG05-50S	530FG05-165S
OG-550	550FG05-25	550FG05-50	550FG05-50S	550FG05-165S
OG-570	570FG05-25	570FG05-50	570FG05-50S	570FG05-165S
OG-590	590FG05-25	590FG05-50	590FG05-50S	590FG05-165S
RG-610	610FG07-25	610FG07-50	610FG07-50S	610FG07-165S
RG-630	630FG07-25	630FG07-50	630FG07-50S	630FG07-165S
RG-645	645FG07-25	645FG07-50	645FG07-50S	645FG07-165S
RG-665	665FG07-25	665FG07-50	665FG07-50S	665FG07-165S
RG-695	695FG07-25	695FG07-50	695FG07-50S	695FG07-165S
RG-715	715FG07-25	715FG07-50	715FG07-50S	715FG07-165S
RG-9	009FG07-25	009FG07-50	009FG07-50S	009FG07-165S
RG-780	780FG07-25	780FG07-50	780FG07-50S	780FG07-165S
RG-830	830FG07-25	830FG07-50	830FG07-50S	830FG07-165S
RG-850	850FG07-25	850FG07-50	850FG07-50S	850FG07-165S