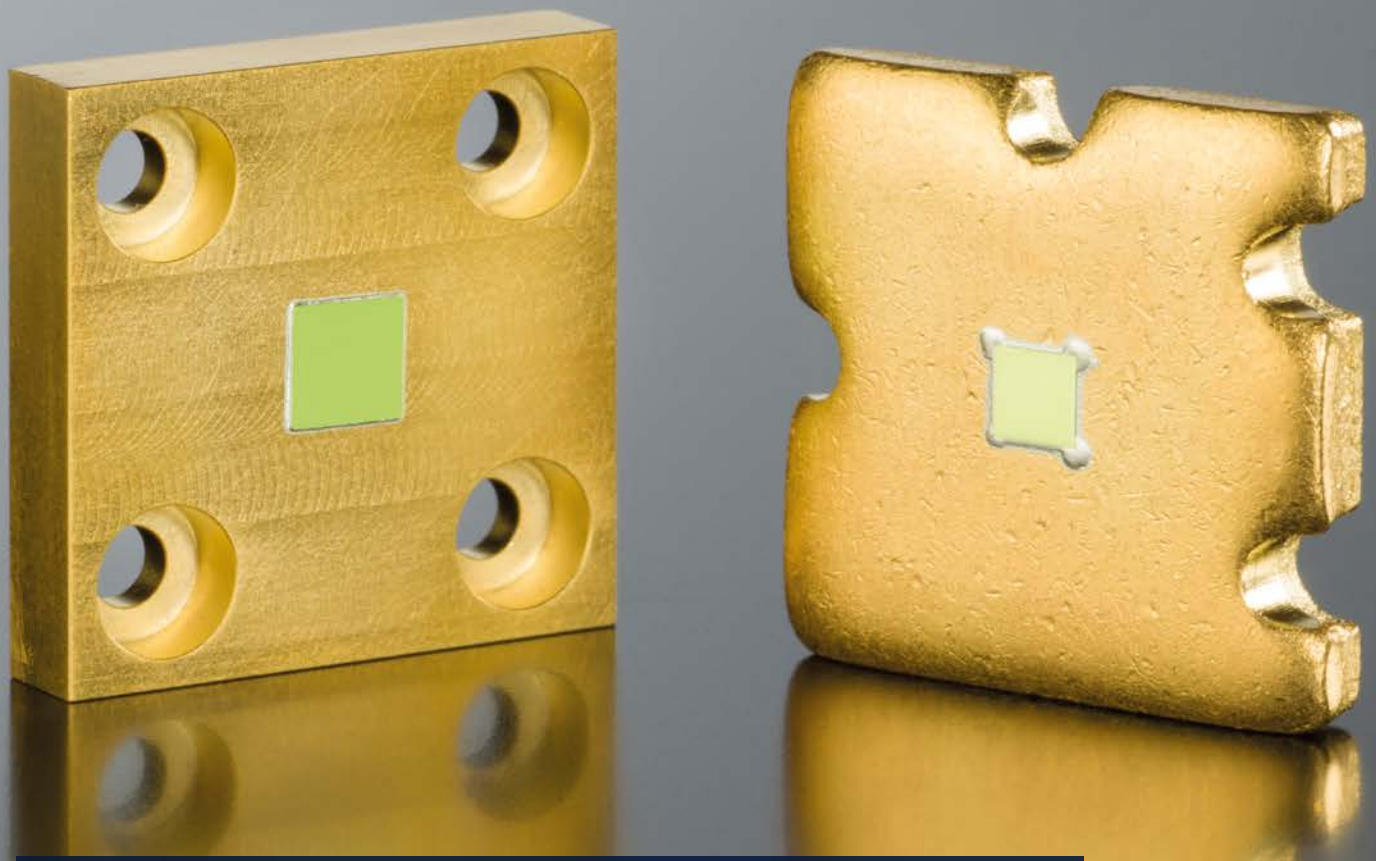
SCHOTT
glass made of ideas

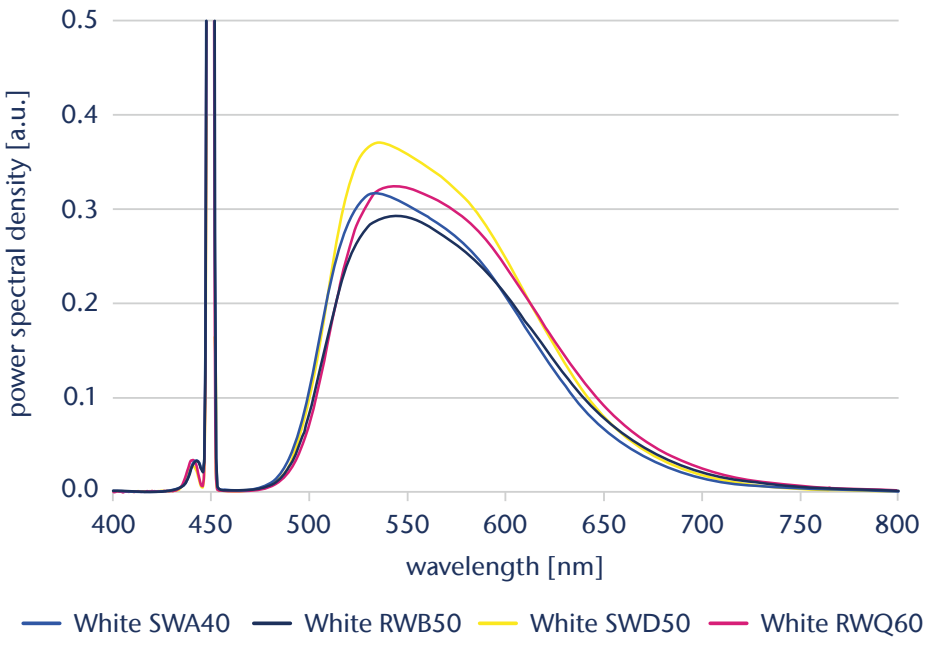


# Static
# Ceramic Converter

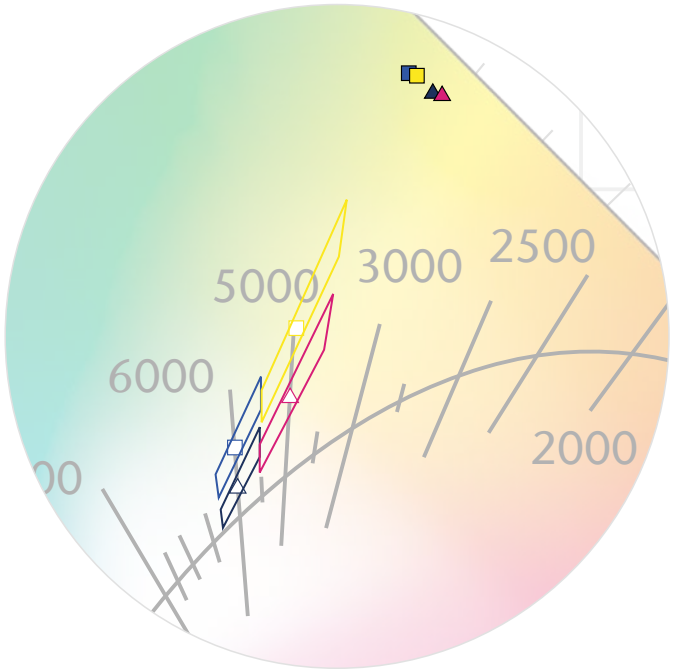
High Luminance Light Sources
White 6,000 K and 5,000 K, Yellow and Green
Anti-reflection coated phosphor on heatspreader

# SCHOTT offers several types of white material

### Emission spectrum




### Tolerance window for white color coordinates ($c_x$ and $c_y$)




Visualization of spec in the CIE 1931 color space.

### Tolerance window

| | $c_x$ | $c_y$ |
|---|---|---|
| **6,000 K** | | |
| White SWA40 | 0.3326 | 0.4021 |
| | 0.3098 | 0.3516 |
| | 0.3114 | 0.3397 |
| | 0.3326 | 0.3845 |
| | 0.3326 | 0.4021 |
| White RWB50 | 0.3325 | 0.3764 |
| | 0.3121 | 0.3342 |
| | 0.3136 | 0.3231 |
| | 0.3325 | 0.3604 |
| | 0.3325 | 0.3764 |
| **5,000 K** | | |
| White SWD50 | 0.3787 | 0.4952 |
| | 0.3330 | 0.3965 |
| | 0.3328 | 0.3797 |
| | 0.3739 | 0.4645 |
| | 0.3787 | 0.4952 |
| White RWQ60 | 0.3708 | 0.4450 |
| | 0.3327 | 0.3688 |
| | 0.3326 | 0.3530 |
| | 0.3664 | 0.4178 |
| | 0.3708 | 0.4450 |

# Technical details

### White 6,000 K (150 µm die thickness, anti-reflection coated phosphor on heatspreader)

| Optical specifications | White SWA40 | White RWB50 | |
|---|---|---|---|
| Conversion efficacy [lm/W] | > 230 | > 220 | |
| Conversion efficiency [W/W] | > 63 % | > 62 % | |
| Emission color coordinates $c_x$ | 0.4100 | 0.4233 | Center values, tolerances ± 0.007 |
| Emission color coordinates $c_y$ | 0.5603 | 0.5514 | |
| White color coordinates $c_x$ | 0.3198 | 0.3212 | Tolerance window see previous pages. |
| White color coordinates $c_y$ | 0.3655 | 0.3454 | |
| Emission color coordinates u' | 0.18420 | 0.19306 | |
| Emission color coordinates v' | 0.56637 | 0.56585 | |
| White color coordinates u' | 0.18961 | 0.19759 | |
| White color coordinates v' | 0.48759 | 0.47807 | |

### White 5,000 K (150 µm die thickness, anti-reflection coated phosphor on heatspreader)

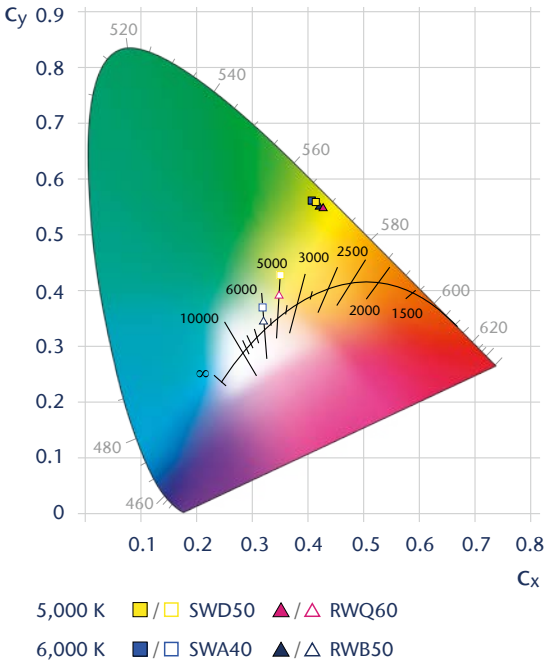
| Optical specifications | White SWD50 | White RWQ60 | |
|---|---|---|---|
| Conversion efficacy [lm/W] | > 240 | > 230 | |
| Conversion efficiency [W/W] | > 62 % | > 61 % | |
| Emission color coordinates $c_x$ | 0.4142 | 0.4287 | Center values, tolerances ± 0.007 |
| Emission color coordinates $c_y$ | 0.5598 | 0.5490 | |
| White color coordinates $c_x$ | 0.3520 | 0.3488 | Tolerance window see previous pages. |
| White color coordinates $c_y$ | 0.4286 | 0.3926 | |
| Emission color coordinates u' | 0.18640 | 0.19642 | |
| Emission color coordinates v' | 0.56677 | 0.56594 | |
| White color coordinates u' | 0.18930 | 0.19895 | |
| White color coordinates v' | 0.51851 | 0.50378 | |

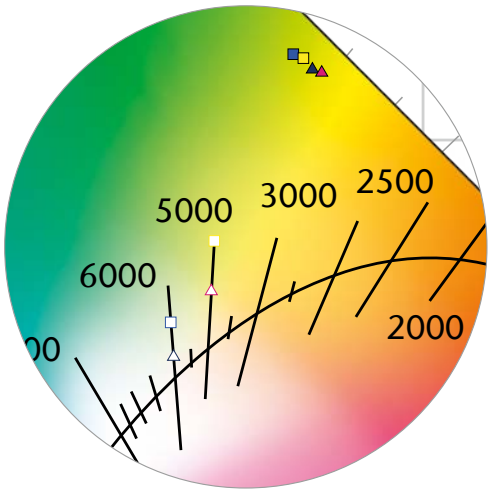
**Notes:**
White color coordinates change with blue laser wavelength and are measured at 449.5 nm.
Emission spectrum is defined by the power spectral density > 465 nm.
Efficacy and efficiency is measured for full (white) spectrum, defined by the power spectral density > 400 nm.
AR coating optimized for blue light incident angle of 60°.
Efficacy, efficiency and color coordinates measured with 60° incident angle of blue laser at low laser power.
Emission is detected in normal direction.

More details see webpage:
https://www.schott.com/ceramic-converter

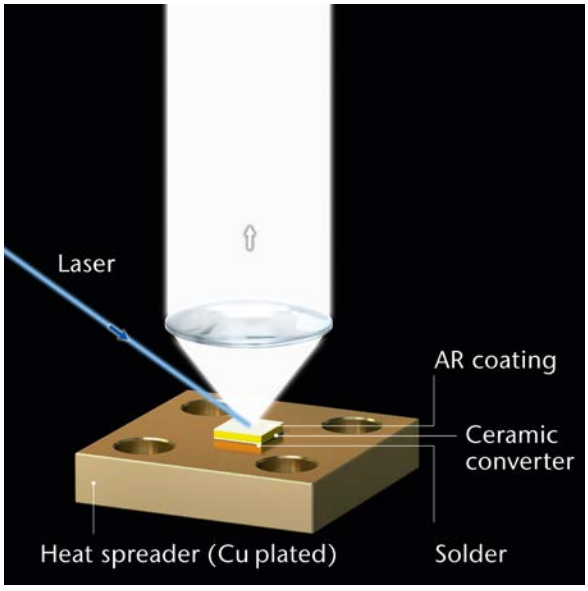
# Static Ceramic Converter – Enabling high luminance for your laser pumped phosphor light sources

SCHOTT converter allow high irradiance and superior luminance. Assembled on a heat sink these components enable compact light sources without moving parts. This is a 100 % inorganic solution offering high reliability.*
SCHOTT offers several types of white static converter materials for correlated color temperatures (CCT) of 6,000 K and 5,000 K each, to serve various applications.



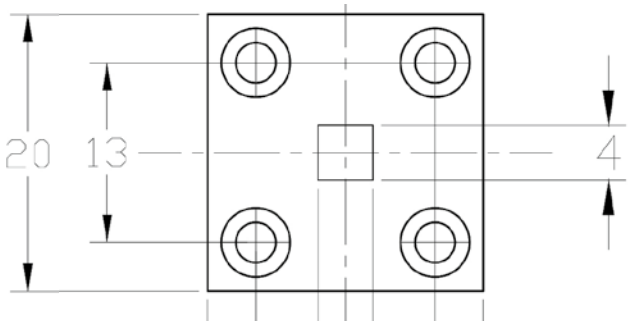




### How does it work for white light?




For white light generation, the material is designed for diffuse reflection of just the right portion of blue light to meet the desired color coordinates.

### White standard samples



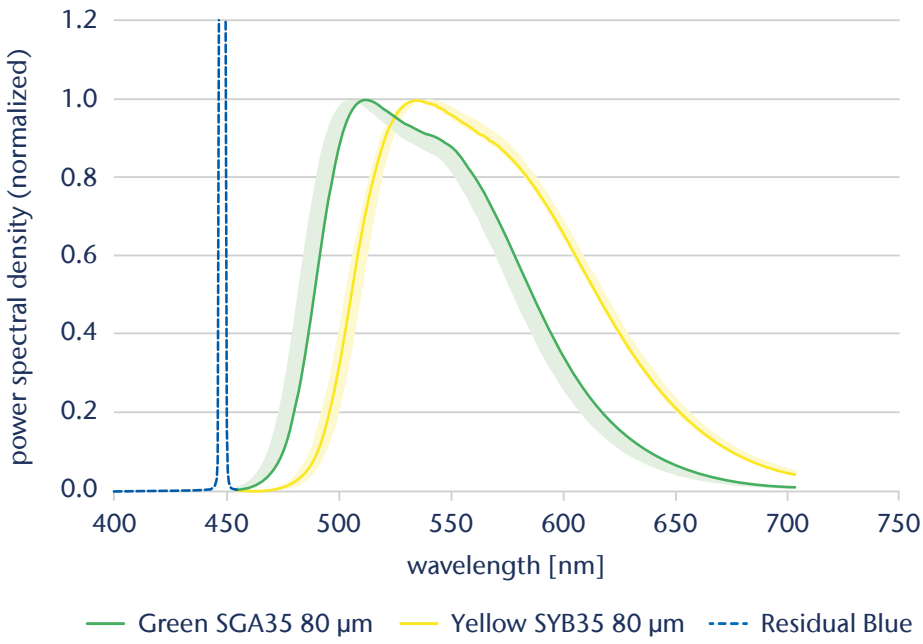

Standard samples available with
heat spreader dimensions of 20 x 20 x 4 mm and
phosphor material dimensions of 4 x 4 x 0.150 mm.

- Customization available upon request
- The applicable tolerances for both dimensions are not shown in this sketch, but are available in the technical drawings upon request.

* Operation above 65 °C on the heat spreader is not recommended.

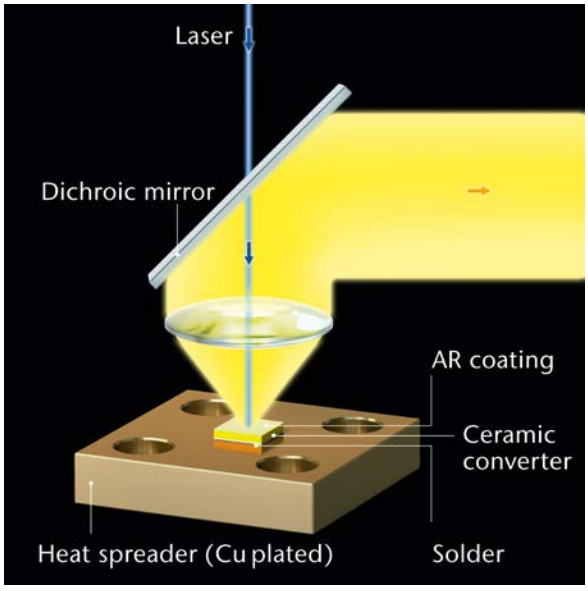
# SCHOTT offers green and yellow converter material

### Emission spectrum



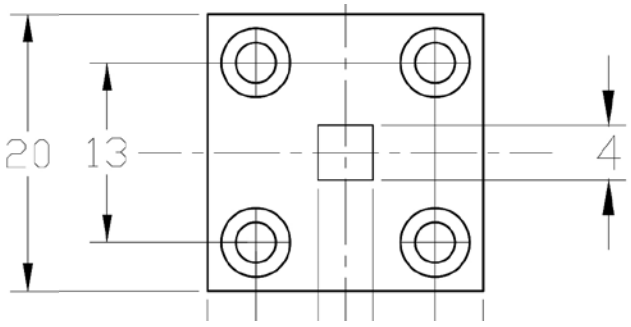

1. Range shows different materials, including GGB35 80 µm, SGF35 80 µm, SGB35 80 µm, SGA35 80 µm, SWA40 80 µm, SYA35 80 µm, SWD50 80 µm, SYB35 80 µm and others
2. Details can be provided upon request

### How does it work for green and yellow light?




Blue laser light is applied via a dichroic mirror. This also blocks residual blue light, that is reflected from the sample. The pure emission spectrum of green or yellow light serves applications like digital projection or stage lighting.

### Yellow/Green standard samples




Standard samples available with heat spreader dimensions of 20 x 20 x 4 mm and phosphor material dimensions of 4 x 4 x 0.080 mm.

- Customization available upon request
- The applicable tolerances for both dimensions are not shown in this sketch, but are available in the technical drawings upon request.

# Technical details

### Yellow (80 µm die thickness, anti-reflection coated phosphor on heatspreader)

| Optical specifications | Yellow SYA35 | Yellow SYB35 | Yellow SWA40 NEW | |
|---|---|---|---|---|
| Conversion efficacy [lm/W] | > 240 | > 250 | > 200 | |
| Conversion efficiency [W/W] | > 50 % | > 52 % | > 42 % | |
| Color coordinates $c_x$ | 0.411 | 0.417 | 0.409 | Center values, tolerances ± 0.01 |
| Color coordinates $c_y$ | 0.561 | 0.557 | 0.559 | |

### Green (80 µm die thickness, anti-reflection coated phosphor on heatspreader)

| Optical specifications | Green SGA35 | Green SGB35 | Green SGF35 | Shifted Green GGB35 | |
|---|---|---|---|---|---|
| Conversion efficacy [lm/W] | > 280 | > 270 | > 240 | > 260 | |
| Conversion efficiency [W/W] | > 59 % | > 57 % | > 51 % | > 57 % | |
| Color coordinates $c_x$ | 0.333 | 0.326 | 0.320 | 0.299 | Center values, tolerances ± 0.01 |
| Color coordinates $c_y$ | 0.590 | 0.587 | 0.583 | 0.579 | |

**Notes:**
Emission spectrum defined by the power spectral density > 465 nm.
Efficacy and efficiency specified for emission spectrum.
AR coating optimized for blue light normal incidence.
Efficacy, efficiency and color coordinates measured with 60° incident angle of blue laser (449.5 nm) at low laser power.
Emission is detected in normal direction.

More details see webpage:
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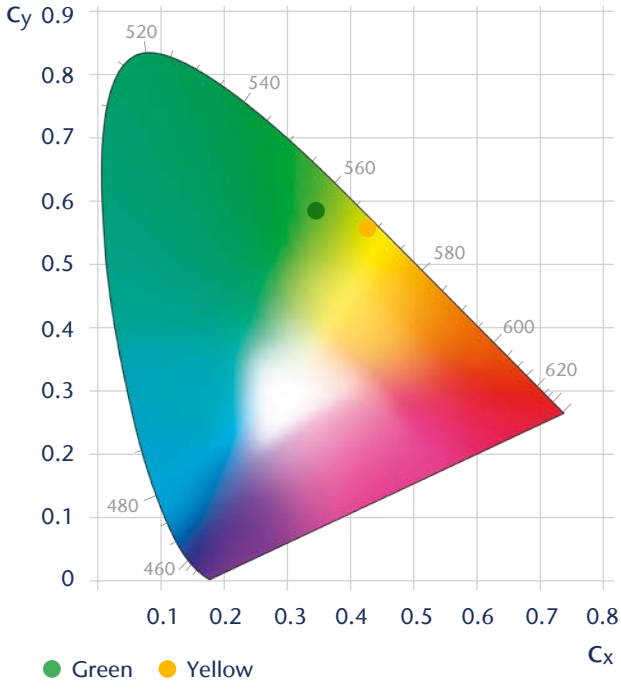
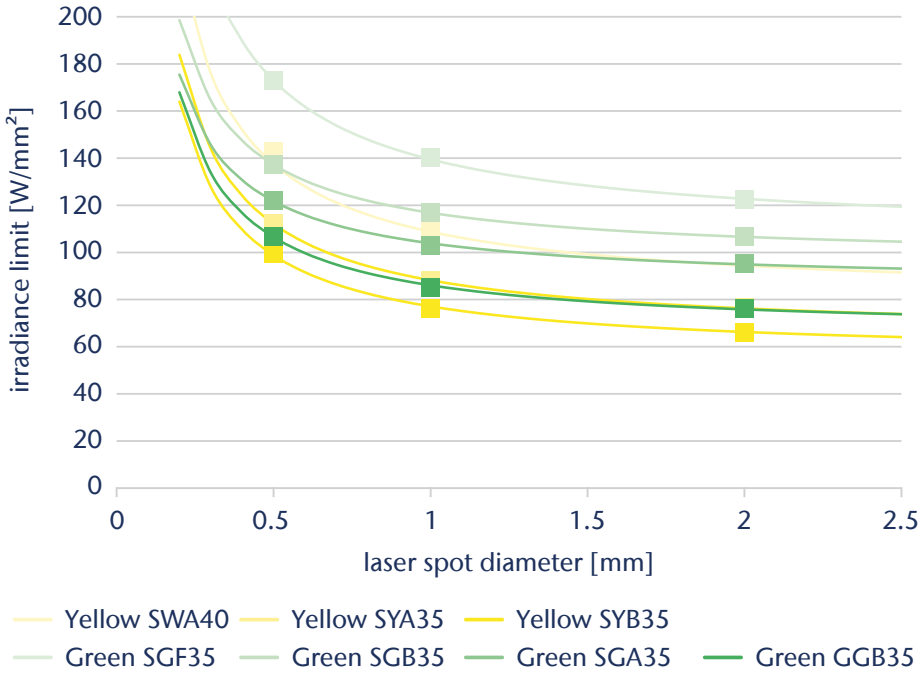


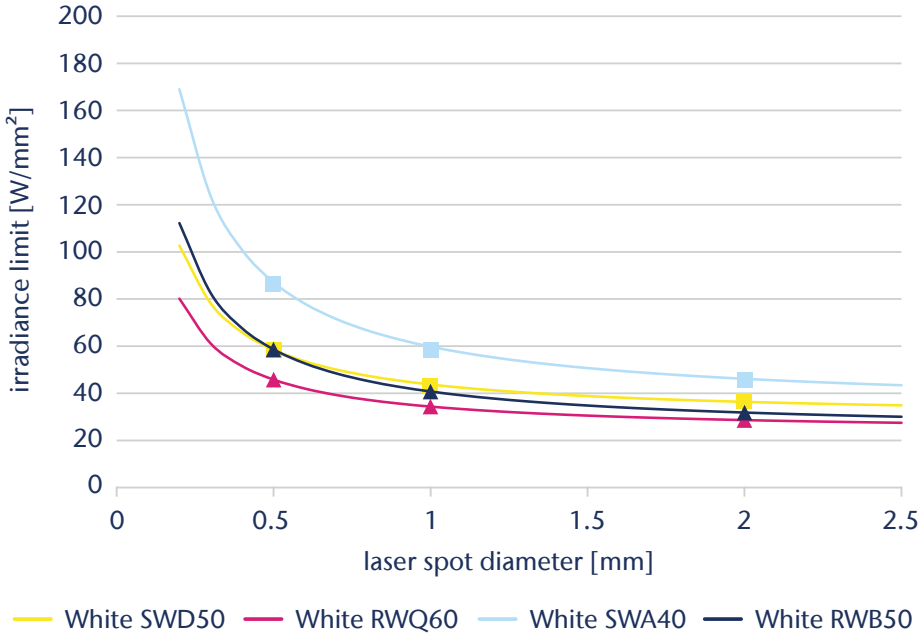

Color coordinates of green and yellow ceramic converter material in the CIE 1931/2° color space

# Products offer high irradiance limits for maximum luminance

**Yellow and green**




**White 5,000 K and white 6,000 K**




**Notes:**
Indicated irradiance limits are not based on measurements, but on validated numerical simulation, taking into account all properties of relevance.
The values apply for illumination by a 450 nm CW mode laser with tophat profile, and for good thermal contact of a heatspreader sized 20x20x4 to a heatsink at 30 °C.
For safety reasons stay at least 20% below indicated irradiance limit. Accordingly, the values on this page may in no case be understood as technical product specifications, and are for general orientation purposes, only.

**schott.com**

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