

Application Note - Color Temperature Adjustment Filters

Lighting: Cinematic • Hotel • Restaurant • Medical • Surgical • Tactical • Architectural

Color Temperature Adjustment Filters are used in a wide variety of lighting applications including architectural and cinematic lighting, analytical test equipment and solar simulators, surgical room lighting, medical imaging, security spotlight illumination and more. They are used to selectively transmit some specific spectral portions of the light so as to be able to adjust or change the color appearance of the light for aesthetic or technical illumination reasons.

Color Temperature Adjustment Filters can be used to give lighting a warmer or cooler color hue as well as change one light source's output to look like another, i.e. converting LED or tungsten light output so it looks like natural sunlight or managing the color temperature distribution of LED's with a selection of adjustment filters to deliver a more consistent color temperature output without yield fall out and need for LED "binning". Originally, color temperatures did refer to the actual temperatures of thermally radiant sources of light in degrees K and an associated standard "color" of light generated like incandescent bulbs with filament temperatures of near 2400K and "warm white" color output. LED's, LCD's, OLED's and many light emitters don't rely on a thermally radiant process for light generation so the use of color temperature is now just a standardized reference describing a perceived broadband light output "color" in the industry.



Cinematic Lighting



Restaurant "Ambience" Lighting

The table below is for general reference only and indicates color temperatures and the typical light sources often associated with them. Lower color temperatures are associated with "warmer" color, or more orange/red hues and higher color temperatures with "cooler" colors or more bluish hues.

| Temperature | Source |
|-----------------|---|
| 1700 K | Match flame, low pressure sodium lamps |
| 1850 K | Candle flame, Sunset/sunrise |
| 2400 K | Standard incandescent lamps |
| 2550 K | Soft white incandescent lamps |
| 2700 K | "Soft white" compact fluorescent & LED lamps |
| 3000 K | Warm white fluorescent, "T" & LED lamps |
| 3200 K | Studio, photofloods, tungsten halogen lamps, etc. |
| 3350 K | Studio "CP" light |
| 5000 K | Horizon daylight |
| 5000 K | Cool white/daylight fluorescent OLED lamps |
| 5500 - 6000 K | Vertical daylight, electronic flash |
| 6200 K | Xenon short-arc lamps |
| 6500 K | Daylight, overcast |
| 6500 - 9500 K | LCD or CRT screen |
| 15000 - 27000 K | Clear blue poleward sky |

Features:

- Filters Provide Warmer or Cooler Color Hues
- Color Temperature Orange (CTO) Filters
- Color Temperature Blue (CTB) Filters
- Standard on "White" Thermally Resilient BORO FLOAT® 33
- Sizes up to 27 Inches (685 mm) in Diameter
- Compact & Handheld Sizes as Small as 5mm
- Plus/Minus Green, RGB, CMYK Filters also Available
- Custom Color, Dichroic, Mired Shift Coatings Upon Request
- Damage Resistant Substrates also Available
- Diffusive & Patterned Glass

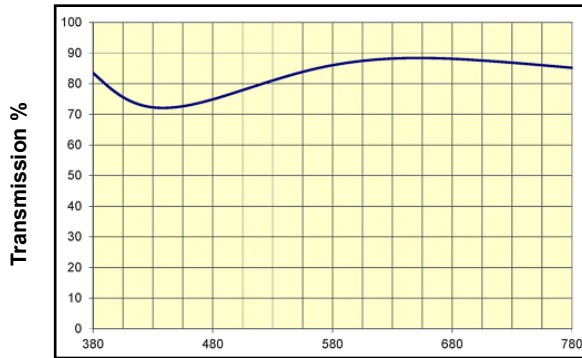
These temperatures are merely characteristic, there may be considerable variation. Source: Wikipedia.

Application Note - Color Temperature Adjustment Filters

Color Temperature Blue (CTB): filters adjust output from a tungsten halogen light source at 3200K to bluer color temperatures. A full CTB filter converts a 3200K tungsten halogen output to 5500K to appear like bright midday sunlight.



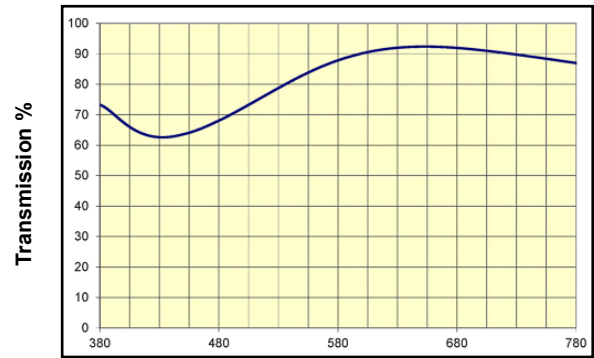
1/8 CTB (Similar to Rosco 3216)



Wavelength (nm)

| Color Temperature Shift °K | Tolerance ± °K |
|----------------------------|----------------|
| 3200 - 3300°K | ± 50 °K |

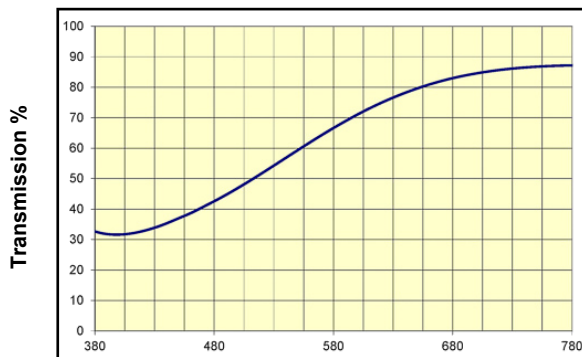
1/4 CTB (Similar to Rosco 3208)



Wavelength (nm)

| Color Temperature Shift °K | Tolerance ± °K |
|----------------------------|----------------|
| 3200 - 3500°K | ± 50 °K |

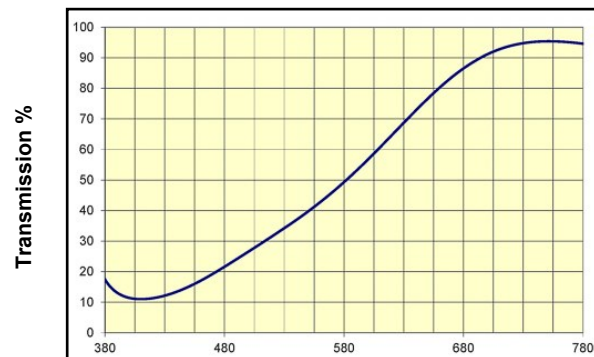
1/2 CTB (Similar to Rosco 3204)



Wavelength (nm)

| Color Temperature Shift °K | Tolerance ± °K |
|----------------------------|----------------|
| 3200 - 4100 °K | ± 350 °K |

FULL CTB (Similar to Rosco 3202)

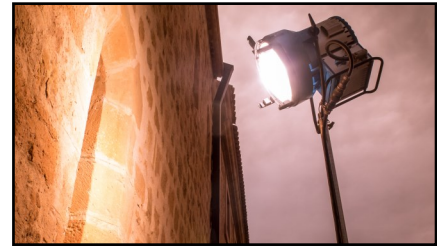


Wavelength (nm)

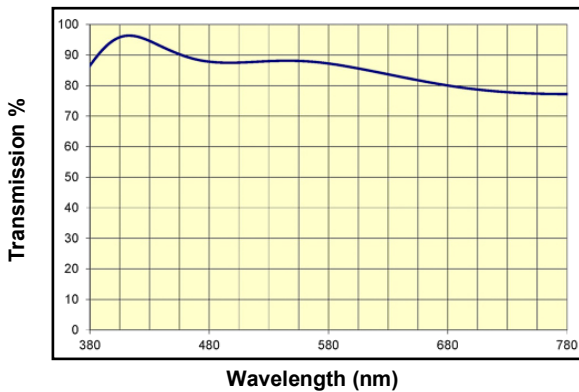
| Color Temperature Shift °K | Tolerance ± °K |
|----------------------------|----------------|
| 3200 - 5500 °K | ± 350 °K |

Application Note - Color Temperature Adjustment Filters

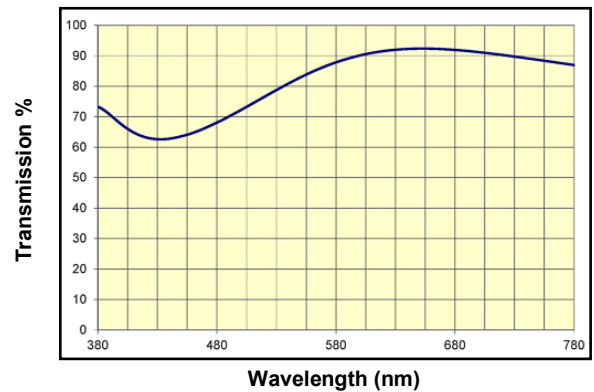
Color Temperature Orange (CTO) filters adjust color temperature from 5500K (midday sunlight) to a warmer color temperature with more orange, amber content. A full CTO would make midday bright blue/white sunlight appear warmer like 2900K incandescent lighting or late afternoon or early am sunlight.



1/8 CTO (Similar to Rosco 3410)



1/4 CTO (Similar to Rosco 3409)



Color Temperature Shift °K

5500 - 4900 °K

Tolerance ± °K

± 100 °K

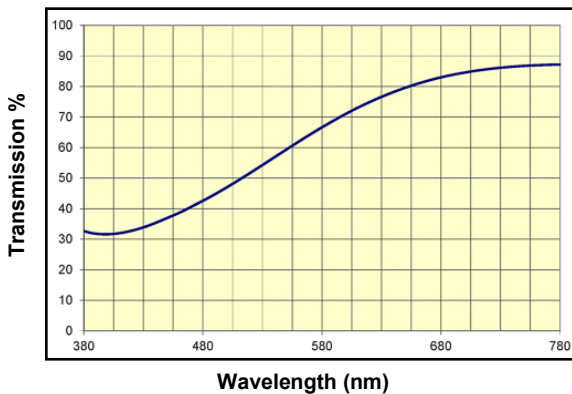
Color Temperature Shift °K

5500 - 4500 °K

Tolerance ± °K

± 150 °K

1/2 CTO (Similar to Rosco 3408)



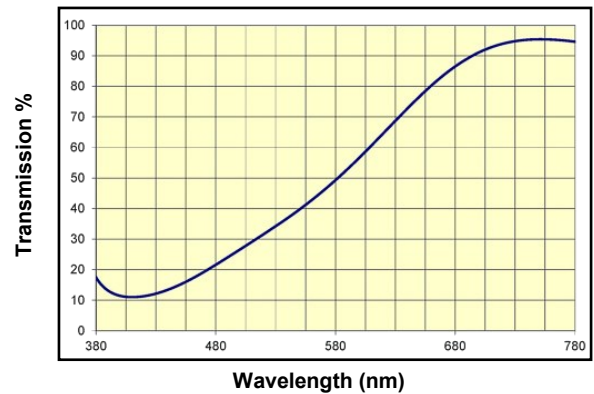
Color Temperature Shift °K

5500 - 3800 °K

Tolerance ± °K

± 210 °K

FULL CTO (Similar to Rosco 3407)



Color Temperature Shift °K

5500 - 2900 °K

Tolerance ± °K

± 325 °K

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Cinematic • Hotel • Restaurant • Medical • Surgical • Tactical • Architectural

Glass Fabrication



Coating Deposition



CNC Machining



Strengthening - Chemical & Heat



Screen Printing of Graphics



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