

All About White Balance

Rome Photo Club

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The Problem...

Sometimes we take pictures and they have a blue or red tinge (or cast).



What is White Balance?

It all boils down to the concept of color temperature. Color temperature is a way of measuring the quality of a light source. It is based on the ratio of the amount of blue light to the amount of red light, and the green light is ignored.

The unit for measuring this ratio is degree Kelvin (K). A light with higher color temperature (i.e., larger Kelvin value) has "more" blue light than a light with lower color temperature (i.e., smaller Kelvin value). Thus, a cooler light (fluorescent) has a higher color temperature. And a hot light (incandescent) has a lower color temperature.

Okay, forget the techno-babble, here is another way to look at it. Sometimes, under certain lighting conditions, your photos come out with a reddish or bluish tinge (or cast).

Light Color Temperature

The reason that pictures turn out with a yellow/orange cast in incandescent (tungsten) lighting and bluish in fluorescent lighting is because light has a **color temperature**. A low color temperature shifts light toward the red; a high color temperature shifts light toward the blue. Different light sources emit light at different color temperatures, and thus the color cast.

In the days of film, we had to place a colored filter in front of the lens.

By using an orange or blue filter, we absorb the orange and blue light to correct for the "imbalance" -- the net effect is a shift in the color temperature.

In digital photography, we can simply tell the image sensor to do that color shift for us. But how do we know in which direction of the color temperature to shift, and by how much?

So, the K value is used to express the amount the light source is towards blue or red.

| <i>Light Sources</i> | <i>Color Temperature in K</i> |
|------------------------|-------------------------------|
| Clear Blue Sky | 10,000 to 15,000 |
| Overcast Sky | 6,000 to 8,000 |
| Noon Sun and Clear Sky | 6,500 |
| Sunlight Average | 5,400 to 6,000 |
| Electronic Flash | 5,400 to 6,000 |
| Household Lighting | 2,500 to 3,000 |
| 200-watt Bulb | 2,980 |
| 100-watt Bulb | 2,900 |
| 75-watt Bulb | 2,820 |
| 60-watt Bulb | 2,800 |
| 40-watt Bulb | 2,650 |
| Candle Flame | 1,200 to 1,500 |

High amount of Blue
Has a lot of energy.

Increasing
Blue

Increasing
Red

High amount of red.
Has low energy.

Now about White Balance...

This is where the concept of "White Balance" comes in. If we can tell the camera which object in the room is white and supposed to come out white in the picture, the camera can calculate the difference between the current color temperature of that object and the correct color temperature of a white object. And then shift all colors by that difference. Most advanced digital cameras therefore provide the feature to manually set the white balance.



Hey Camera, this pillow is white. I want you to adjust all the other colors so it comes out white!

Using White Balance Color Cards...

Many digital cameras now provide the feature to manually set the white balance. By pointing the camera at a white or gray card (angled so that it is reflecting light from the room) as a neutral reference, filling the screen completely with it, then pressing the White Balance button (or set it in the menu), the camera does its WB calculation.

From then on, any picture taken will have its color temperature shifted appropriately. It's quite simple, really, and you should not be afraid to try it out and see your indoors pictures improve considerably (assuming there is enough light for correct exposure).

[A "neutral" gray is 18% gray and will reflect all colors equally.]

Caution:

- Make sure the card is not in shadows, but illuminated by the artificial light in the room
- If you are bouncing light off the walls, ensure the card is reflecting the bounced light

White Balance Color Cards



\$20 Set



\$50 Set

WB Settings on a CoolPix 3000

AUTO Auto (default setting)

White balance automatically adjusted to suit lighting conditions. Best choice in most situations.

PRE Preset manual

Neutral-colored object used as reference to set white balance under unusual lighting conditions. See "Preset Manual" for more information (📖 40).



Daylight

White balance adjusted for direct sunlight.



Incandescent

Use under incandescent lighting.



Fluorescent

Use under fluorescent lighting.



Cloudy








Use when taking pictures under overcast skies.



Flash

Use with the flash.

WB Setting on a Canon 50D

| Display | Mode | Color Temperature (Approx. K: Kelvin) |
|-------------------------------------------------------------------------------------|--------------------------|---------------------------------------|
| AWB | Auto | 3000 - 7000 |
|  | Daylight | 5200 |
|  | Shade | 7000 |
|  | Cloudy, twilight, sunset | 6000 |
|  | Tungsten light | 3200 |
|  | White fluorescent light | 4000 |
|  | Flash use | 6000 |
|  | Custom (p.72) | 2000 - 10000 |
| K | Color temperature (p.73) | 2500 - 10000 |

Meters that Measure the Color Temperature



\$990



\$1099