

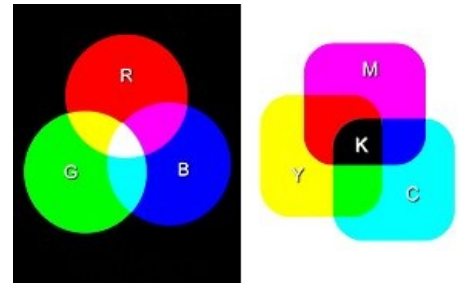
# CMYK color model

CMYK is a color model based on color mixing. By mixing colors, we subtract from each other - we limit the color spectrum that is reflected on the surface.

The model includes 4 basic colors:

- **Cyan**
- **Magenta**
- **Yellow**
- **Key** (not black) - this color is created by overlapping all other colors.

The black color does not have to be part of the color model in all cases - it should be enough to mix the other three colors. In fact (e.g. in printing) black is used because mixing colors is uneconomical.



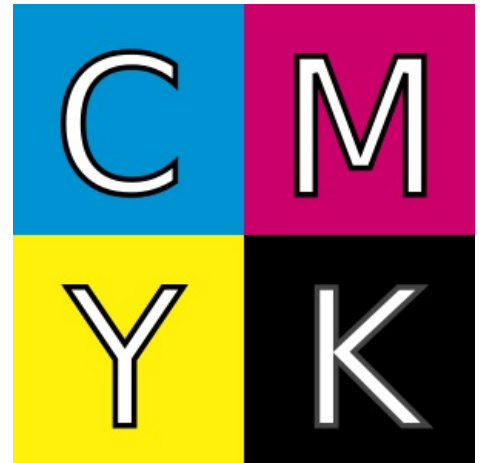
CMYK color model

## RGB - CMYK color conversion

Printing an RGB image requires converting it to the CMYK model. This process is handled by the printer driver, or the so-called RIP in professional printing. Neither model can display the entire color spectrum, so different color changes occur. The biggest problem is printing complementary colors (red, blue, green). This is mainly due to the fact that the monitor directly emits light, while the print reflects light. However, thanks to the perception of colors in context, this limitation is usually not noticeable in the result.

## Comparison with RGB

Comparing these two models is not easy, the models rather complement each other and each has different features. Printers using the CMYK model cannot print in 256 different intensities of each component, but must use only one shade of each color. A more perfect result is then achieved by other auxiliary methods such as fluctuation or halftone.



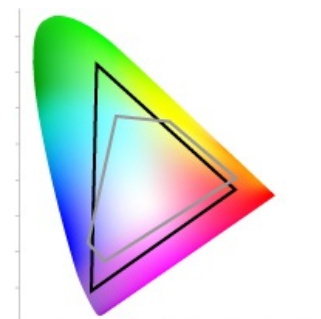
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## Black color - Key

The black color generated by mixing the basic three components is in many cases imperfect, so a separate black color is used. This is mainly for the following reasons:

- a combination of 100% intensity of all three colors would cause the image to spread on the paper;
- black ink is cheap compared to "wasting" three inks at once;
- the combination of colors does not create pure black, but rather a dark brown color for the eye.

When a very dark surface is needed, the so-called rich black is used, where CMY colors are layered and then covered with a layer of black (K).



The black triangle belongs to the RGB model, the gray line to the CMYK model

## Links

## References

- QVALITA,, et al. *CMYK* [online]. wiki, The last revision 2012, [cit. 2012-11-27]. <<https://cs.wikipedia.org/wiki/CMYK>>.
- HIGHLAND MARKETING,, et al. *Getting to Know RGB and CMYK* [online]. [cit. 2012-11-27]. <<http://www.hiland.com/knowledge-base/>>.
- HEINE, Ben. *Sistema de cores - CMYK x RGB* [online]. [cit. 2012-11-27]. <[http://fotografeumaideia.com.br/site/index.php?option=com\\_content&task=view&id=1619&Itemid=138](http://fotografeumaideia.com.br/site/index.php?option=com_content&task=view&id=1619&Itemid=138)>.

