

# **Solution for better printing grayscale photos on dye-based low cost ink-jet printers**

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## **Abstract**

Printing grayscale photos on dye-based low cost ink-jet printers can be problematic due to 4 or 6 or more colors ink systems because it uses mainly RGB system for printing on basically CMYK printing systems or expanded CLcMLmYK (Lc – light cyan; Lm – light magenta). It is functioning very good or excellent for color photos, but with grayscale photos comes problems such as color cast, no matter what type or paper is used, or problems with darkening/lightening parts of the photos. In this paper it will be shown how to override such problems and print very good quality grayscale photos with appropriate preparation and file editing in Adobe Photoshop and Adobe Illustrator.

Key words: grayscale image, ink-jet, dye-based ink.

## **Introduction**

Grayscale images are stored in RGB color space or grayscale color space files and printed on dye-based low cost ink-jets such as Epson L1800 printer through color conversion in printer driver. There are various printer drivers, such as original from printer producer or generic printer drivers in Adobe Illustrator or Adobe Photoshop. No matter what type of driver is used, printing grayscale photo from grayscale file or from RGB file results with slight or stronger color shift.

Great affection on correct color could be made with carefully chosen paper from producers such as Hahnemuehle or Tecco. Some printing surfaces comes with its own .icc profiles and usage of profiles can improve prints.

## **Related work and procedures**

In this paper suggested technique gives very good printing output for grayscale images. Basically we need to force printer to use CMY nozzles in equally percentage of CMY colors for every pixel of the photo. K nozzle is black so this won't affect on color shift.



*Photo 1. Info layer shows different and not in balance values for CMY channels for red circle area.*

This can be obtained on the following way: Convert grayscale image to CMYK in Adobe Photoshop. Then go to Image – Adjustment – Levels and check Options. Turn on Enhance Monochromatic Contrast and Snap Neutral Midtones. Although it will make smaller changes on the photo, results of this actions will be that CMY values are almost the same or with 1% or 2% difference for each pixel.

In this example color values for CMYK are:

C 42% (before correction) / 39% after – difference 3%

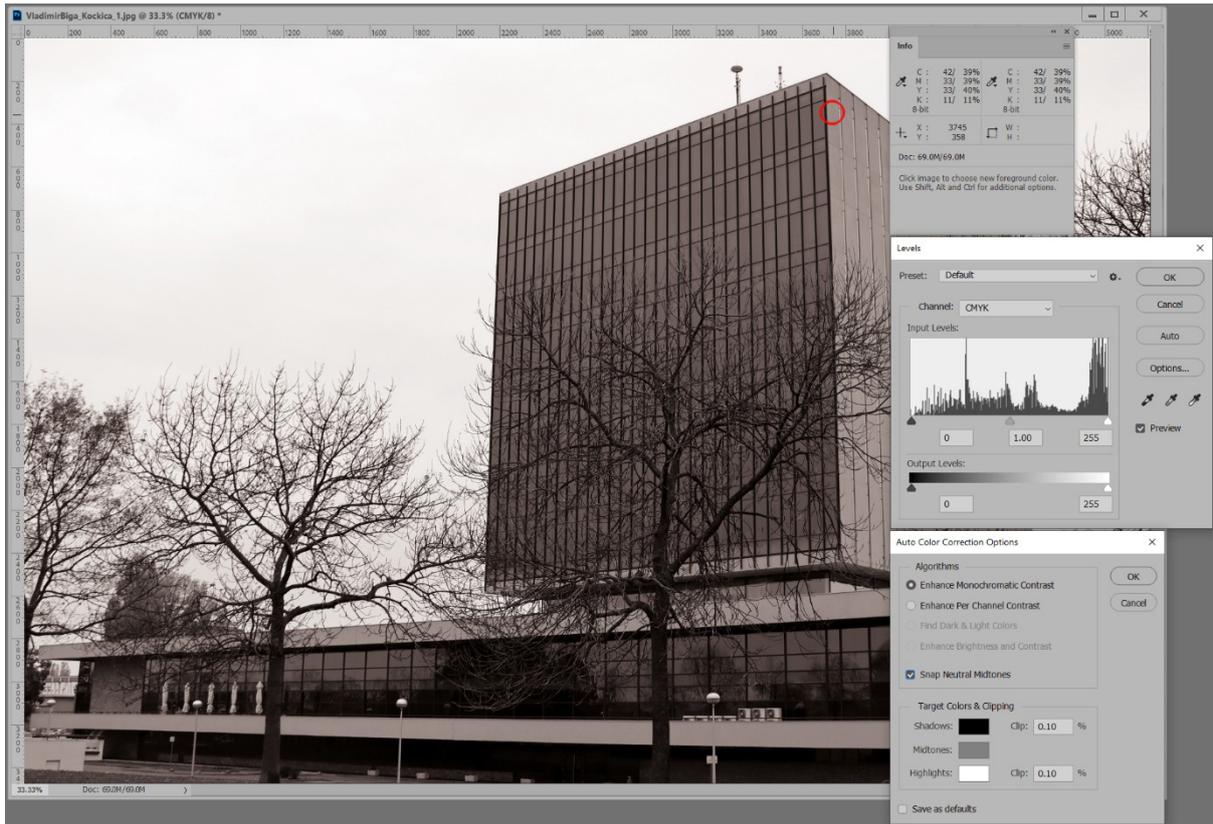
M 33% (before correction) / 39% after – difference 6%

Y 33% (before correction) / 40% after – difference 7%

K 11% (before correction) / 11% after – difference 0%

There is visually slight color shift to warmer color (due to higher difference in M and Y channel) on the screen in Photo 1., but final printed output will depend on how printer CMY color are appear when they are in equal values. In the further text I suggest to print sample chart to see this C 50% M 50% Y 50% color on desired printing surface.

Unfortunately something needs to be given in the sense of photo quality to make better grayscale output on paper surfaces and in this example it is a slightly warmer grayish tone. A real trial is a best practice for described procedure.



*Photo 2. Info layer shows values for CMY channels which are after correction in better balance than before for red circle area.*

Second phase in to force printer to print photo with Press quality standards and preparation through Adobe Illustrator. Artboard in Document CMYK mode with photo on it can be Saved As .pdf with press quality settings.

Final phase in printing photo is with printer driver with corresponding paper type selected and ICM model chosen for Color settings. ICM model, in Epson printer driver case, ensure that printer driver don't change any color values in the printing process.

## Conclusion

Printed photo will be good enough as dye-based inks are used for its printing process. 50% gray color made of C 50% M 50% Y 50% will be warmer or colder, depends of producer. It is recommended to print sample color chart with before mentioned CMY combination to see main gray tone or feeling of the whole photo.

Theoretically best way for such adjustment for better grayscale printing is with direct intervention in photo file and correcting CMY values for each pixel. Even usual average function implemented on CMY values will provide better results with printing than through usual RGB color space conversion via printed driver.