



INFLUENCE OF COLOR SEPARATION ON COLOR REPRODUCTION IN DIGITAL PRINTING

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Reproduction in accordance with the original, which is often the product itself. That is why the digitization of real products and the creation of original layouts has its own specifics: studio shooting using color targets is used [1, 2]. The production of advertising catalogs by digital printing requires adjustments in the preparation of original layouts, namely in the process of color separation. Transformation between color models is certainly one of the important components of the process of preparing images for printing. The method of conversion largely determines the accuracy of color reproduction in accordance with the original. Negligence at this stage leads to color mismatch and loss of nuances in the reproduction of images, which will complicate the market for the sale of samples of products in advertising catalogs.

There are three main types of color separations that designers and prepress professionals have to deal with: convert from RGB to CMYK; converting a color image to black and white; convert color image or black and white to duoton. There are certain limitations that must be taken into account when performing color separation: the undesirable nature of repeated color conversions; the percentage of total inks in the image; the maximum amount of black ink in the image; the level of black ink generation; total ink transfer in digital printing. Currently, there are two types of color separation, which are used for specific tasks according to the known features of each of them GCR (Gray Component Replacement), UCR (Under Color Removal).

The aim of the work is to study the reproduction of color by electrophotographic printing using UCR and GCR color separation. The amount of dot gain is average and the same, because we assume that in this case the parameter of dot gain in the output of images by electrophotographic printing does not play a significant role. The Konica Minolta Bizhub C224e digital printing device was chosen for printing, which is positioned as a multifunctional device for scanning, copying and printing with possible additional functions of post-printing processing: folding, perforation, binding. Usually when printing, profiles are built for each type of printed material and toner brand in order to take into account their possible impact on the color reproduction of the print. But profiling was not used in the research, printing was carried out at the standard settings of the printing device. The color adjustment of the captured images was performed in two modes: manual and automatic using the captured color target ColorChecker Passport, Adobe RGB 16-bit workspace 300 ppi. In the manual processing mode, the following actions were performed: downloading images in the format of shooting on a PC, opening the image in Adobe CameraRAW, adjusting the exposure, hue so as to preserve the details of the image; Adobe RGB conversion; framing; gradation and color correction; save image. In the automatic processing mode, the following actions were performed: downloading images in the format of shooting on a PC, opening with



Adobe Photoshop Lightroom so that this image contains a captured color target ColorChecker Passport; right-click on the image in the imported images panel, select Export-X-Rite Presets-ColorChecker Passport in the pop-up menu, enter the profile name *.dng in the window that appears and click OK; closing the program for the changes to take effect. When you reopen the program, the created profile is applied to an image or set of images from the same series, after which they must be saved in the desired format (for example, *.psd, *.tiff).

The results of measurements and calculations indicate the inexpediency of using the GCR None and UCR color separation mode for files processed manually, and the predominant inexpediency of using the GCR None color separation mode for files processed automatically. When reproducing images that contain saturated dark colors, the UCR color separation mode will not provide sufficient color saturation, and GCR None when using three colors – two color and one black, may distort the color, which will not provide the desired color ratio. The least problematic color separation mode, which gives minimal color distortion for images with many different tones, including rich blue and orange, and the absence of deep shadows, there is a UCR mode when applying the automatic color processing mode. At the same time, Magenta, Yellow will reproduce better with GCR Light/GCR None. It is obvious that the UCR color separation mode with the manual color processing mode gives the greatest amount of distortion (max ΔE for four fields), and the GCR Light color separation mode with automatic processing mode has advantages in two fields. So, mainly, the GCR Light color separation mode can give the best results for both light originals and some that contain elements of dark tones.

If you print color-processed files directly from RGB mode, immediately after color processing, you avoid the color separation stage and print files saved in Adobe RGB (1998) without conversion: "Input file – Adobe RGB (color-process) – CMYK (color separation) – RGB (algorithm of digital printing equipment)", there is a possibility of providing greater color coverage of some digital printing devices. If digital printing of reproductions is used as a test or preliminary according to the scheme "Input file – Adobe RGB (color processing) – CMYK (color separation) – CMYK (algorithm for printing equipment)" then provided that the requirements for prepress processing color accuracy will depend largely on the characteristics printing process. For example, expanding the color coverage of digital printing prints by calibrating and profiling equipment for specific paper and toner.

References

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