

## REPRODUCTION OF MEMORABLE COLORS ON PAPERS WITH DIFFERENT SHADES AND STRUCTURES

*Khmiarchuk Olga, PhD in technics, associate professor,  
Sheremet Volodymyr, master, NTUU «KPI named after I. Sikorskyi»*

Memorable colors, such as body colors, the color of the sky, green grass, should be of a shade that is familiar to the human eye. However, this is not always possible to achieve on printed prints.

Flesh colors are the most difficult to reproduce with any printing method. The structure of the surface of the material, the color of the base and the application technology have the greatest influence on color transfer.

The material to be printed on and its characteristics play a large role in the color transfer of any printing method.

In the course of the experiment, research was conducted on optical indicators when printing on digital equipment. For printing, five types of chalked paper were chosen, different in shade and structure, but with the same weight of 150 g/m<sup>2</sup>. The main characteristics of the materials are listed in Table 1. Printing was carried out on three Lexmark CX 510 de, DEVELOP Ineo+224e and Bizhub C 258 printing machines. A test form was chosen for printing on digital machines and researching optical indicators of print quality.

Table 1 – Characteristics of samples of materials for experimental studies

No. of the sample	Type of paper	Shade of color	L	a	b	$\Delta E$
1	Matte paper	White	94,06	2,29	-4,04	
2	Matte paper	Yellow	91,57	-0,18	10,52	16,86
3	Glossy paper	White	91,19	1,07	-3,95	3,41
4	Glossy paper	Creamy	93,01	0,48	0,48	5,09
5	Design paper	White	91,37	1,1	-3,41	2,95

Given that flesh colors are the most difficult to reproduce, the scale with flesh and pastel colors was chosen for analysis (fig. 1).



Figure 1 – Colors for analysis

The results of the obtained studies were processed in Microsoft Excel software and based on them graphs were drawn comparing the value of the color shift  $\Delta E$  for each of the samples within the limits of the material and type of equipment.



For data analysis, the color with the best and worst performance against the benchmark was selected for each type of hardware. Samples of products printed on matte chalked paper weighing  $150 \text{ g/m}^2$  – sample 1 – were chosen as the standard.

Graphs were constructed for better visualization of the results. For samples printed on the Bizhub C 258 FFT, the best results were shown by C25M62Y100K90, and the worst by C6M5Y12K5 (fig. 2-3).

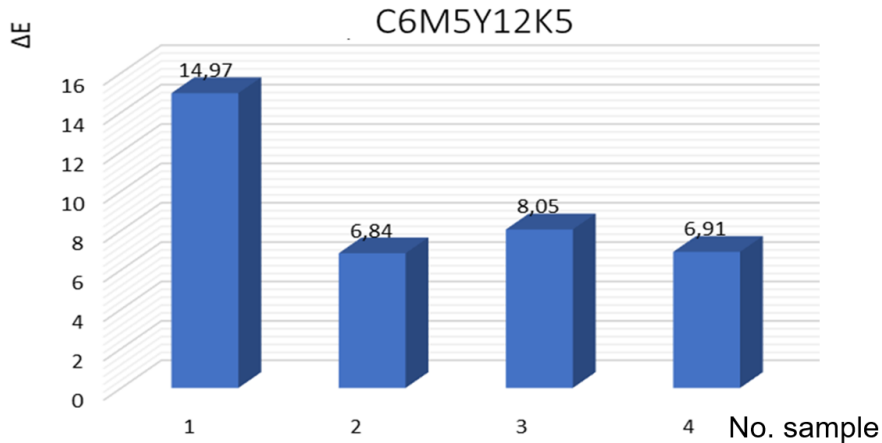


Figure 2 – Graphic representation of  $\Delta E$  colors of C6M5Y12K5 (a) printed on DEVELOP Ineo+224e: 1 – sample 2; 2 – sample 3; 3 – sample 4; 4 – sample 5.

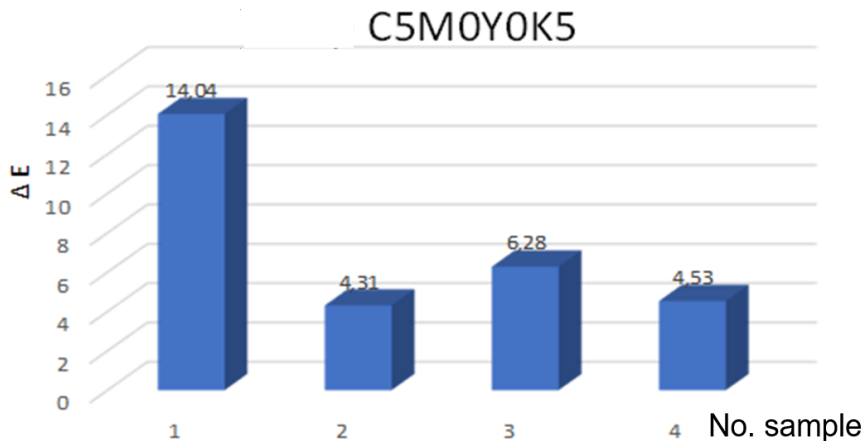


Figure 3 – Graphic representation of  $\Delta E$  colors of C5M0Y0K5 printed on Lexmark CX 510 de: 1 – sample 2; 2 – sample 3; 3 – sample 4; 4 – sample 5.

After processing the results of the research, it can be concluded that for printing products on digital equipment it is better to use white untinted papers to reduce color distortion. When using paper that has a certain shade, it is necessary to take into account the color shift at the stage of creating a layout and pre-press preparation. It can be concluded that when reproducing light beige and brown shades of colors, digital printing equipment gives the worst results.