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Technical sciences

THE INFLUENCE OF PRINTED MATERIAL ON THE LIGHTNESS OF THE PANTON COLOR IN TAMPON PRINTING

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Abstract: *The influence of methods of causing ink in tampon printing on the index of lightness of ink when printing on tinted surfaces is considered.*

Keywords: *tampon printing, printing ink, printing machine, hue, lightness, color tone, saturation.*

The modern market of packaging and souvenirs requires rapid application of the image on the surface of the product. The classic printing methods are designed for printing flat surfaces, and the method of tampon printing allows you to print on products of almost any shape, as well as to apply images on the surface, which are almost impossible to decorate with other printing methods. A promising direction is the use of tampon printing in the decoration of toys and earthenware of different geometries; souvenir products, such as pens, cups, thermoses, packaging made of wood, metal or plastic.

Ceramics, plastics, glass, fabrics and other materials having a different color from white and different surface properties are used

as a basis for printing. Therefore, it is difficult and sometimes impossible to use measuring instruments for color control, and very often color control is carried out visually. In this case, the assessment of color reproduction of the image is subjective and depends on individual characteristics of color perception by a particular observer (example, threshold of human perception of color, color tone, saturation), as well as external conditions (room lighting, color tone of printed material, edge contrast).

In the manufacture of packaging and souvenirs, companies often use corporate colors, usually pantons inks. The difficulty of reproducing panton color with tampon printing is that color samples from the Pantone color catalog are made by offset printing on different types of paper, and printing is performed on surfaces of the product/material that have different color characteristics and properties from paper. Achieving maximum color identity on the print relative to the original is extremely difficult. Reproduction of the selected color, according to the Pantone catalog, on tinted unsaturated surfaces in tampon printing involves some errors due to the following factors [1]:

- the printing material differs from the base of the original, for example, a different roughness and color of the surface;
- other dyes/pigments in inks are used in tampon printing, which affects on the spectral characteristics of inks.

It is well known that the optical color density of the imprint in the tampon printing depends on the ink transfer coefficient, and the graphical accuracy of image reproduction from the force of the tampon to the contact surfaces.

To achieve maximum color identity on tinted non-absorbing surfaces (plastics of different colors, wood, glass, metal), a method of causing ink layers in tampon printing was proposed. The method of causing the ink involves: a single causing of ink; twice (in two layers); applying a white background under the main paint layer.

Printing was performed with one-component inks from Marabu Tampaplus TPL 922 (light yellow) and TPL 970 (white).

According to ISO 12647-2: 2013 [2], the lihtness index for

yellow ink on coated glossy paper is 84 for a white background and 81 for a black background. For tampon printing, this indicator is not standardized, so when evaluating the lightness of the yellow ink on non-absorbing surfaces focused on the indicators given in ISO 12647-2: 2013.

The figure shows that all samples have a general tendency to reproduce lightness. Double causing of printing ink reduces the deviation in the lightness of the color, but only a small amount. Than darker the color of the printed material, the smaller this value. Printing on a white background provides almost accurate color reproduction on all surfaces, if we take the standard of color reproduction on white plastic (Fig. pos. 1). Therefore, for accurate color reproduction on dark and saturated surfaces, it is recommended to use a white background.

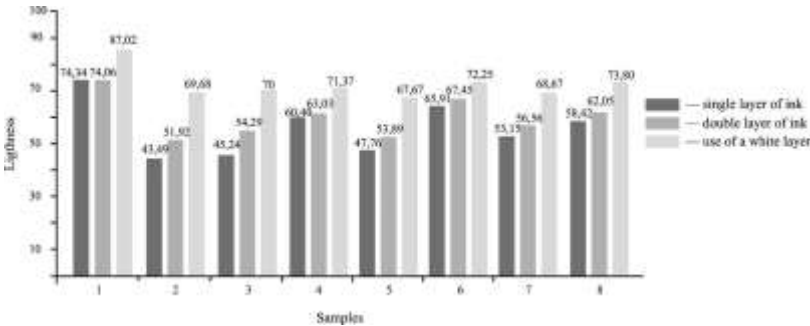


Figure. Influence of the printed material on an indicator of lightness at various ways of causing printing ink: where, 1 – white plastic; 2 – blue plastic; 3 – red plastic; 4 – yellow plastic; 5 – green plastic; 6 – metal; 7 – glass; 8 – wood

Conclusion: The relationship between the method of causing printing ink on the lightness index, namely, single causing, double causing of ink and the use of a white substrate under the main ink layer. Based on the results of the research, developed the recommendations for the selection of the optimal technological scheme for the process of pad printing on tinted surfaces in order to ensure maximum color identity.

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