



COLORIMETRIC PARAMETERS OF NATIONAL FLAGS OF UKRAINE AND BULGARIA

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Abstract. *The necessity of standardizing the colors of state flags is discussed. The main colors of the Ukrainian and Bulgarian state flags and their numerical parameters in different color reproduction systems are presented. The procedure for controlling color characteristics by the method of comparison with standard samples is described.*

Standardization of national flag colors is important for several reasons:

- consistency and recognizability: standardized colors ensure that the national flag looks the same each time it is displayed, regardless of the material, manufacturer, or environmental conditions;

- symbolism and meaning: the colors of national flags often carry out symbolic meanings related to the history, culture, or values of a nation, so standardization ensures the accurate and consistent transference of these meanings;

- protocol and ceremonies: it is extremely important that national flags are identical in color and appearance at official events, diplomatic meetings, and military ceremonies, as this promotes compliance with the protocol and ensures the respectful representation of national symbols;

- manufacturing and quality: color standards allow manufacturers to create flags that exactly meet official requirements, ensuring higher quality and preventing the appearance of incorrectly colored flags;

- international recognition: standardization and the official definition of a national flag's colors contribute to its international recognition and proper representation in an interstate context.

The national flag of Ukraine consists of two equal to the width of the horizontal stripes: the upper stripe is in blue color, and the lower stripe is yellow color, with a ratio of the flag's width to its length of 2:3 [1].

The national flag of Bulgaria consists of three colors: white, green, and red, arranged horizontally from top to bottom, with the color fields being equal in shape and size, and a ratio of the flag's width to its length of 3:5 [2].

The parameters of the primary colors of the national flags of Ukraine and Bulgaria in different color reproduction systems are shown in Table 1.

Table 1 – Parameters of the primary colors of the national flags of Ukraine and Bulgaria

Кольори	Pantone-textile	Pantone	RGB	CMYK	HEX	HTML
Blue	-	2935 C	0, 87, 183	100, 53, 0, 28	#0057b8	#0066CC
Yellow	TPK-269-1 1/82	012 C	255, 215, 0	0, 16, 100, 0	#ffd700	#FFCC00
White	whiteness \geq 80%	whiteness \geq 80%	255, 255, 255	0, 0, 0, 0	#ffffff	#FFFFFF
Green	17-5936 TC	347 U	0, 155, 117	100, 0, 25, 39	#009b75	#00966E
Red	18-1664 TC	032 U	208, 28, 31	0, 87, 85, 18	#d01c1f	#D62612



The main standardized color reproduction system is the Pantone Color Matching System [3], which includes 2161 colors. Table 1 also provides the corresponding color parameters in the RGB, CMYK, and HEX systems, as well as the values for color reproduction on web resources (HTML).

Not every color from the Pantone palette can be reproduced with the triadic colors – the range of mixed Pantone colors is much wider than that of the CMYK triadic colors. Therefore, in many cases, Pantone colors (fig. 1) are used for precise color reproduction instead of triadic inks.



Figure 1 – Reproduction of the Ukraine flag in Pantone colors

The Pantone company in 2022 chose new primary colors – yellow and blue colors for the Ukrainian flag: Energizing Yellow та Freedom Blue. In this way, the organization supported Ukraine.

Control of color characteristics of the flag fabric is done according to the requirements of [4] or based on standard color samples according to [5], using the visual comparison method as outlined in [6]. It is considered that the reference sample is described by a grade of 4. If necessary, test color samples are made according to the same rules as the standard samples.

Standard samples of the primary colors of the flags of Ukraine and Bulgaria are kept at the National Scientific Centre 'Institute of Metrology' (Kharkiv) and at the Committee for Standardization and Metrology of Bulgaria (Sofia), respectively.

In the case of flag reproduction in print production, its colors can be reproduced using offset, gravure, flexographic, screen, tampon, and intaglio printing technologies. In this case, it is recommended to use the specified Pantone color set (table 1). For digital printing, the reproduction is done with triadic inks according to table 1, with mandatory color reproduction control.

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