



# Standard Test Method for Evaluating Color Image Output from Color Printers and Copiers<sup>1</sup>

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## 1. Scope

1.1 This test method covers the evaluation of color output from printer/plotters and copiers. The output may be from an ink jet, thermal transfer, electrostatic or electrophotographic device.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*

D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates<sup>2</sup>

## 3. Summary of Test Method

3.1 A printer or copier is set up to standard operating parameters and operated under a controlled environment for a length of time sufficient for stable performance. A color test image is created using a program for the printer or a standard color chart for copiers. A colorimeter is used to measure the printer or copier output by determining color difference values which correlate to visual color assessment.

## 4. Significance and Use

4.1 This test method is used to evaluate the color output capability of color printer/plotters or copiers. The color copy, print, or plot is measured such that the results can be correlated to human color vision.

4.2 This test method can be used to make machine-to-machine comparisons. It can be used to compare color printer or copier processes (ink jet, thermal transfer, etc.).

4.3 This test method can be used to compare imaging supplies such as toner, ink, thermal transfer ribbons, and paper.

## 5. Interference

5.1 Any changes in the color of the paper, surface proper-

ties, or brighteners may affect the color measurement.

5.2 The measured color may be affected by the location on the paper due to uneven toning or positional variations in the imaging process.

5.3 If the print samples to be tested are not completely opaque, the color measurements will be affected by the backing material.

5.4 The preferred colorimeter geometry excludes gloss from the measurements. Any differences in sample gloss will not be measured by the colorimeter.

## 6. Apparatus

6.1 *Colorimeter*, capable of measuring human vision color parameters. The colorimeter shall be capable of measuring in units of  $L^*$ ,  $a^*$  and  $b^*$  using  $45^\circ/0^\circ$  or integrating sphere geometry. Refer to Test Method D 2244 for definitions of color scales. The  $45^\circ/0^\circ$  geometry is the closest approximation of actual office reading environment. The illuminant shall be illuminant C.

6.2 *Printer or Copier*, to be evaluated.

## 7. Reagents and Materials

7.1 Sufficient quantities of paper and imaging supplies to run the evaluation.

7.2 A reference color test target.

7.2.1 For printers and plotters the reference color test target can be made from color chips or selected printer/plotter output. The colors must include red, green, blue, yellow, cyan, magenta, black, and white. Each color must cover a sufficient area to permit measurement by the colorimeter. A 25.4 mm (1 in.) diameter circular area is sufficient for most colorimeters.

7.2.2 For color copiers the reference color test target can be made from selected color chips and is used as the original to be copied. The colors must include red, green, blue, yellow, cyan, magenta, black, and white. A 25.4 mm (1 in.) diameter circular area is sufficient for most colorimeters.

## 8. Conditioning

8.1 The paper, imaging supplies, and printer or copier should be conditioned in the test environment for 24 h prior to initiating the test.

8.2 The environment in which the following procedure is carried out should be controlled to reduce adverse effects. The temperature should be controlled  $\pm 2.77^\circ\text{C}$  ( $\pm 5^\circ\text{F}$ ) around the

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 06.01.