



Standard Guide for Test Methods for Forensic Writing Ink Comparison¹

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INTRODUCTION

This guide is intended to be a general guide for forensic ink examinations, both for the experienced document examiner (**E 444**) and for forensic ink comparison specialists. The aim is to include those techniques that will provide the most information about an ink with the least damage to the document. Therefore, this guide refers to well-reported and thoroughly tested techniques currently in use by document examiners in general practice and dedicated forensic ink comparison facilities.

By following the procedures outlined here, an examiner can accurately discriminate ink formulas and reduce the possibility of false matches of ink samples from different sources or incorrect differentiation of ink samples with a common origin.

1. Scope

1.1 This Guide is intended to assist forensic examiners comparing writing or marking inks. Included in this analysis scheme are the necessary tools and techniques available to reach conclusions as to the common or different origin of two samples of ink.

1.2 Identifying ink formulas as to their manufacturer or time of manufacture as well as performing ink dating examinations are beyond the scope of this guide.

1.3 *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:*²

D 1535 Practice for Specifying Color by the Munsell System

E 131 Terminology Relating to Molecular Spectroscopy

E 284 Terminology of Appearance

E 444 Descriptions of Scope of Work Relating to Forensic Document Examiners

2.2 *NIST Standards:*

NBS Standard Sample No. 2106 ISCC-NBS Centroid Color Charts³

NBS Special Pub. 440 Color: Universal Language and Dictionary of Names³

3. Terminology

3.1 *Definitions:*

3.1.1 *batch to batch variation*—within an ink formulation, difference in the concentration of a component of an ink formula due to deviations during production that are within the manufacturer's tolerance limit.

3.1.2 *chromatography*—a method of separating substances that is widely used in analytical and preparative chemistry. It involves the flow of a liquid or gas mobile phase over a solid or liquid stationary phase. As the mobile phase flows past the stationary phase, a solute will undergo repeated adsorption and desorption and move along at a rate depending, among other factors, on its ratio of distribution between two phases. If their distribution ratios are sufficiently different, components of a mixture will migrate at different rates and produce a characteristic pattern (chromatogram).

3.1.3 *fluorescence*—a process by which radiant flux of certain wavelengths is absorbed and reradiated nonthermally at other, usually longer, wavelengths. (**E 284**)

3.1.4 *infrared (IR)*—referring to radiant flux having wavelengths longer than the wavelengths of light, usually wavelengths from about 760 nm to about 3 mm. (**E 284**)

3.1.5 *light*—electromagnetic radiant energy that is visually detectable by the normal human observer, radiant energy having wavelengths from about 380 nm to about 780 nm.

¹ This guide is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.02 on Questioned Documents.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from U.S. Department of Commerce, National Bureau of Standard Reference Materials, R. B311, Chemistry Building, Gaithersburg, MD 20899.