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Standard Guide for Forensic Paint Analysis and Comparison[1]

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1. Scope

1.1 Forensic paint analyses and comparisons are typically distinguished by sample size that precludes the application of many standard industrial paint analysis procedures or protocols. The forensic paint examiner must address concerns such as the issues of a case or investigation, sample size, complexity and condition, environmental effects, and collection methods. These factors require that the forensic paint examiner choose test methods, sample preparation schemes, test sequence, and degree of sample alteration and consumption that are suitable to each specific case.

1.2 This guide is intended as an introduction to standard guides for forensic examination of paints and coatings. It is intended to assist individuals who conduct forensic paint analyses in their evaluation, selection, and application of tests that may be of value to their investigations. This guide describes methods to develop discriminatory information using an efficient and reasonable order of testing. The need for validated methods and quality assurance guidelines is also addressed. This document is not intended as a detailed methods description or rigid scheme for the analysis and comparison of paints, but as a guide to the strengths and limitations of each analytical method. The goal is to provide a consistent approach to forensic paint analysis.

1.3 *Some of the methods discussed in this guide involve the use of dangerous chemicals, temperatures, and radiation sources. This guide does not purport to address the possible safety hazards or precautions associated with its application. 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 requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products[2]

D 1535 Method for Specifying Color by Munsell System[2]

E 308 Test Method for Computing the Colors of Objects by Using the CIE System[2]

E 1492 Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory[3]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide other than those listed in 3.2, see Terminology D 16.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *additive (modifier)*—any substance added in a small quantity to improve properties. Additives may include substances such as dryers, corrosion inhibitors, catalysts, ultraviolet absorbers, plasticizers, etc.

3.2.2 *binder*—a non-volatile portion of a paint which serves to bind or cement the pigment particles together.

3.2.3 *coating*—a generic term for paint, lacquer, enamel, or other liquid or liquifiable material which is converted to a solid, protective and/or decorative film after application.

3.2.4 *discriminate*—to distinguish between two samples based on significant differences; to differentiate.

3.2.5 *discriminating power*—the ability of an analytical procedure to distinguish between two items of different origin.

3.2.6 *known sample*—a coating sample of established origin.

3.2.7 *paint*—commonly known as a pigmented coating (see 3.2.3).

3.2.8 *pigment*—a finely ground, inorganic or organic, insoluble, dispersed particle. Besides color, a pigment may provide many of the essential properties of paint, such as opacity, hardness, durability and corrosion resistance. The term pigment includes extenders.

3.2.9 *questioned sample*—a coating sample whose original source is unknown.

3.2.10 *significant difference*—a difference between two samples that indicates that the two samples do not have a common origin.

4. Quality Assurance Considerations

4.1 A quality assurance program must be used to ensure that analytical testing procedures and reporting of results are monitored by means of proficiency tests and technical audits.

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[2] *Annual Book of ASTM Standards*, Vol 06.01.

[3] *Annual Book of ASTM Standards*, Vol 14.02.

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