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Standard Guide for Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations[1]

This standard is issued under the fixed designation E2288; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide provides procedures that should be used by forensic document examiners (Guide E444) for examinations and comparisons to determine whether or not two or more paper fragments were at one time joined to form a single piece of paper.

1.2 These procedures are applicable whether the examination(s) and comparison(s) is of questioned and known items or of exclusively questioned items.

1.3 These procedures include evaluation of the sufficiency of the material available for examination.

1.4 The particular methods employed in a given case will depend upon the nature sufficiency of the material available for examination.

1.5 This guide may not cover all aspects of unusual or uncommon examinations.

1.6 *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:*[2]

E444 Guide for Scope of Work of Forensic Document Examiners

E1732 Terminology Relating to Forensic Science

E2195 Terminology Relating to the Examination of Questioned Documents

3. Terminology

3.1 *Definitions*—For definitions of terms in this guide, refer to Terminology E1732 and Terminology E2195.

4. Significance and Use

4.1 This guide is intended for, but may not be limited to, physical match examinations of paper items. The physical matching or realignment of items of evidence may occur in two or three dimensions.

4.2 The procedures outlined here are grounded in the generally accepted body of knowledge and experience in the field of forensic document examination. By following these procedures, a forensic document examiner can reliably reach an opinion concerning whether or not two or more paper fragments were at one time parts of a single piece of paper.

5. Interferences

5.1 Items submitted for examination may have inherent limitations that can interfere with the procedures in this guide. Limitations should be noted and recorded.

5.2 Limitations can be due to limited quantity, or comparability, or condition of the items submitted for examination. The condition of a paper sample may make it unsuitable for some types of examinations (for example, items that are water soaked, stained, soiled, charred, or finely shredded paper). Such features are taken into account in this guide.

5.3 The results of prior storage, handling, testing, or chemical processing (for example, for latent prints) can interfere with the examination of certain characteristics. Whenever possible, document examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations.

5.4 In the absence of individual characteristics, it may only be possible to demonstrate an association between two or more items through the commonality of class characteristics.

6. Equipment and Requirements

6.1 Appropriate light source(s) of sufficient intensity to allow fine detail to be distinguished.

NOTE 1—Natural light, incandescent or fluorescent sources, or fiber optic lighting systems are generally utilized. Transmitted lighting, side lighting, and vertical incident lighting have been found useful.

6.2 Magnification sufficient to allow fine detail to be distinguished.

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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.

6.3 Other apparatus as appropriate. Aids in the examination process can include clamps, clips, temporary adhesives, and other materials that will not adversely affect the specimen(s).

6.4 Imaging or other equipment for recording observations as required.

6.5 Sufficient time and facilities to complete all applicable procedures.

7. Procedure

7.1 All procedures shall be performed when applicable and noted when appropriate. These procedures need not be performed in the order given.

7.2 Examinations performed, relevant observations, and results shall be documented.

7.3 At various points in these procedures, a determination that a particular feature is not present or that an item is lacking in quality or comparability may indicate that the examiner should discontinue or limit the procedure(s). It is at the discretion of the examiner to discontinue the procedure at that point and report accordingly or to continue with the applicable procedures to the extent possible. The reasons for such a decision shall be documented.

7.4 Determine whether or not the specimens are broken or separated.

7.5 Determine whether or not the specimens are suitable to be physically realigned.

7.6 Evaluate the specimens for individualizing characteristics.

7.7 Conduct a side-by-side comparison of the specimens using the following steps:

7.7.1 Visual inspection.

7.7.2 Manual alignment.

7.7.3 Edge-to-edge realignment.

7.7.4 Surface markings.

7.7.5 Measurements and pattern count.

NOTE 2—Consideration should be given to repackaging the items in a manner that preserves fragile match areas, facilitates recovery, and permits demonstration.

7.8 Evaluate similarities, differences, and limitations. Determine their significance individually and in combination.

7.9 Reach a conclusion and report accordingly

8. Report

8.1 Conclusion(s), or opinion(s), or other finding(s) resulting from the procedures in this guide may be reached once sufficient examinations have been conducted.

8.2 The bases and reasons for the conclusion(s), opinion(s), or finding(s) should be included in the examiner's documentation and may also be included in the report.

8.3 Once examinations and comparisons have been completed, reports may include, but are not limited to, the following types of conclusions and other findings.

8.3.1 The paper fragments were at one time joined to form a single piece of paper.

8.3.2 Although class similarities were observed, there were insufficient individual features to determine whether or not the paper fragments were at one time joined to form a single piece of paper.

8.3.3 The paper samples did not originate from a single piece of paper.

NOTE 3—As a result of the reconstruction of the paper fragments, additional examinations (for example, latent prints or indentations) may be appropriate. The report may also include information such as the visible text, indentations, and contaminants observed following reconstruction.

9. Keywords

9.1 cut paper; forensic sciences; fracture fit; fracture match; paper fragments; perforations; physical match; questioned documents; torn paper