



# Standard Guide for Indentation Examinations<sup>1</sup>

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## 1. Scope

1.1 This guide provides procedures that should be used by forensic document examiners (E 444) for examinations and comparisons involving visualization and recording of indentations.

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

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

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

1.5 *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:

E 444 Guide for Descriptions of Scopes of Work Relating to Forensic Sciences for Questioned Document Area<sup>2</sup>

E 1732 Terminology Relating to Forensic Science<sup>2</sup>

E 2195 Terminology Relating to the Examination of Questioned Documents<sup>2</sup>

## 3. Terminology

3.1 *Definitions*—For definitions of terms in this guide, refer to Terminologies E 1732 and E 2195.

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *direct contact, n*—two sheets of paper, one on top of the other, with no intervening sheets.

3.2.2 *electrostatic detection device (EDD), n*—an instrument used to visualize paper fiber disturbances (for example, indentations, erasures, typewritten material/lift off).

3.2.3 *film, n*—thin transparent plastic material that covers the item during an examination using an EDD.

3.2.4 *indentations, n*—latent or visible impressions in paper or other media.

3.2.5 *indirect contact, n*—two sheets of paper, one on top of the other, with one or more intervening sheets.

3.2.6 *lift, n*—the product of an EDD examination; a self-adhesive plastic sheet adhering to a film that preserves the results of an EDD examination.

3.2.7 *primary indentations, n*—impressions caused by the act of writing or other dynamic actions.

3.2.8 *secondary impression(s), n*—fiber disturbances caused by contact with the embossed side of indentations and not caused by the act of writing.

3.2.9 *side lighting, n*—illumination from a light source that is at a low angle of incidence, or even parallel, to the surface of the item. Syn. *oblique lighting*.

## 4. Significance and Use

4.1 When sheets of paper are in direct or indirect contact with one another, impressions on the top sheet can produce indentations on the sheet(s) below.

4.2 This guide establishes procedures for visualizing those indentations.

4.2.1 These procedures are essentially non-destructive; however, pencil writing and single-strike ribbon typing can be partially lifted from the document by EDD. Although this effect can be minimal, adequate documentation of such items should precede EDD.

4.3 Paper fiber disturbances caused by erasures or present in torn paper edges may be visualized using this guide.

4.4 Electrostatic detection device (EDD) examinations may be useful in developing other types of impressions on paper items (for example, typewritten material, shoeprints and latent prints).

4.5 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 indentations.

## 5. Interferences

5.1 Certain 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 The size, shape, density or condition of an item may make it unsuitable for the EDD portion of the procedure (for example, some book covers, large file folders and items that have been wet or damaged after indentations were made).

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 14.02.

5.3 A complete examination involves the use of both the optical and EDD portions of the procedure. All indentations may not be revealed if the optical and EDD portions of the procedure are not conducted.

5.4 The results of prior storage, handling, testing, or processing may interfere with these procedures. Chemical processing for latent prints generally interferes with indentation examination results. Indentation examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations (for example, with clean cloth gloves).

5.5 Items should be handled as little as possible prior to EDD examination to prevent contamination (for example, the introduction of latent prints and additional indentations). Improper handling (for example, rubbing the item surface with cloth gloves) may also impede EDD examination results.

5.6 EDD examination may yield secondary impressions as well as primary impressions. Caution should be taken when attempting to determine whether impressions are primary or secondary.

5.7 In some locations (that is, areas with low humidity), conducting an EDD examination without prior humidification of the document may impede examination results.

5.8 Periodically check the condition of the glass beads utilized in EDD examinations. They can deteriorate with use, affecting the quality of the developed EDD image.

5.9 Repeated processing with EDD can result in degraded images.

## 6. Equipment and Requirements

6.1 Light source(s) of sufficient intensity and appropriate form to be used for side lighting.

6.2 Electrostatic detection device (EDD).

6.3 Imaging or other equipment for recording observations as required.

6.4 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 should be performed in the order given.

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

7.3 View the item being examined using side lighting that is directed at the item from various angles and directions. In some instances, the use of side lighting in a room with subdued light may provide better visualization of indentations.

7.3.1 Document any indentations observed.

7.3.2 If indentations are not observed, document the lack of visible indentations.

7.4 Determine whether the item is suitable for EDD examination.

7.4.1 If the item is not suitable, discontinue examination and report accordingly.

7.5 Each suitable item should be examined using an EDD.

7.5.1 The EDD shall be operated utilizing the instructions provided in the operating manual, laboratory procedures, and current technical research.

7.5.2 A control indentation shall be successfully developed and recorded on the day of examination. This control can be conducted prior to, or concurrently with, the EDD examination of the item(s).

7.5.2.1 If the control indentation is not successfully visualized, the problem shall be corrected before any further indentation examinations are conducted with that instrument.

7.6 Results of the EDD examination may be preserved by making a lift.

7.7 If no indentations are developed, the results will be documented or preserved, or both, according to laboratory policy.

NOTE 1—In situations where the developed results are faint or there is background interference, or both, results may be difficult to see. In such instances, the results should be lifted and evaluated using an appropriate background.

7.8 Lifts shall be maintained according to laboratory policy.

7.9 Evaluate and document results of the EDD examination.

7.10 If indentations or other images are visualized, conduct other examinations as appropriate.

## 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 appear in the examiner's documentation and may also appear in the report.

8.3 Once examinations and evaluations have been completed, reports may include the following types of conclusion(s), opinion(s), or finding(s):

8.3.1 Whether indentations were observed.

8.3.2 Whether decipherable indentations were observed.

8.3.3 The text of deciphered indentations.

8.3.4 Information as to the source of indentations.

## 9. Keywords

9.1 electrostatic detection device (EDD); embossing; forensic science; indentations; questioned documents

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