

EXHIBIT E

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ASTM INTERNATIONAL
STANDARD E 2290 - 07A
(STANDARD GUIDE FOR EXAMINATION
OF HANDWRITTEN ITEMS)



Standard Guide for Examination of Handwritten Items¹

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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 handwritten items and related procedures.

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

1.3 These procedures include evaluation of the sufficiency of the material (questioned, or known, or both) available for examination.

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

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

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

E 444 Guide for Scope of Work of Forensic Document Examiners

E 1658 Terminology for Expressing Conclusions of Forensic Document Examiners

E 1732 Terminology Relating to Forensic Science

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.

E 2195 Terminology Relating to the Examination of Questioned Documents

3. Terminology

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

3.2 Definitions:

3.2.1 *known, n/adj*—of established origin associated with the matter under investigation. **E 1732**

3.2.2 *questioned, n/adj*—associated with the matter under investigation about which there is some question, including, but not limited to, whether the questioned and known items have a common origin. **E 1732**

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *absent character, n*—a character or character combination which is present in one body of writing but is not present (for example, does not have a corresponding character) in another body of writing.

3.3.2 *character, n*—any language symbol (for example, letter, numeral, punctuation mark, or other sign), other symbol, or ornament.

3.3.3 *characteristic, n*—a feature, quality, attribute, or property of writing.

3.3.4 *comparable, n/adj*—pertaining to handwritten items that contain the same type(s) of writing and similar characters, words, and combinations. Contemporaneousness and writing instruments may also be factors.

3.3.5 *distorted writing, n*—writing that does not appear to be, but may be natural. This appearance can be due to either voluntary factors (for example, disguise, simulation) or involuntary factors (for example, physical condition of the writer, writing conditions).

3.3.6 *handwritten item, n*—an item bearing something written by hand (for example, cursive writing, hand printing, signatures).

NOTE 1—As used in this standard “handwriting” and “handwritten” are generic terms. Writing is generally, but not invariably, produced using the hand, and may be the result of some other form of direct manipulation of a writing or marking instrument by an individual.

3.3.7 *individualizing characteristics, n*—marks or properties that serve to uniquely characterize writing.

3.3.7.1 *Discussion*—Both class characteristics (marks or properties that associate individuals as members of a group) and individual characteristics (marks or properties that differentiate the individual members in a group) are individualizing characteristics.

3.3.8 *item, n*—an object or quantity of material on which a set of observations can be made.

3.3.9 *natural writing, n*—any specimen of writing executed without an attempt to control or alter its usual quality of execution.

3.3.10 *range of variation, n*—the accumulation of deviations among repetitions of respective handwriting characteristics that are demonstrated in the writing habits of an individual. (See *variation*, 3.3.15).

3.3.11 *significant difference, n*—an individualizing characteristic that is structurally divergent between handwritten items, that is outside the range of variation of the writer, and that cannot be reasonably explained.

3.3.12 *significant similarity, n*—an individualizing characteristic in common between two or more handwritten items.

3.3.13 *sufficient quantity, n*—that amount of writing required to assess the writer's range of variation, based on the writing examined.

3.3.14 *type of writing, n*—refers to hand printing, cursive writing, numerals, symbols, or combinations thereof, and signatures.

3.3.15 *variation, n*—those deviations among repetitions of the same handwriting characteristic(s) that are normally demonstrated in the habits of each writer.

3.3.15.1 *Discussion*—Since variation is an integral part of natural writing, no two writings of the same material by the same writer are identical in every detail. Within a writer's range of variation, there are handwriting habits and patterns that are repetitive and similar in nature. These repetitive features give handwriting a distinctive individuality for examination purposes. Variation can be influenced by internal factors such as illness, medication, intentional distortion, etc. and external factors such as writing conditions and writing instrument, etc.

4. Significance and Use

4.1 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 two or more handwritten items were written by the same person(s).

NOTE 2—The phrase “written by the same person(s)” refers to physical generation of the writing, not to intellectual ownership of the content.

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 submission of non-original documents, limited quantity or comparability, or condition of the items submitted for examination. Other limitations can

come from the quantity or comparability of the writing submitted, and include absent characters, dissimilarities, or limited individualizing characteristics. 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) may interfere with the ability of the examiner to see certain characteristics. Whenever possible, document 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).

5.4 Consideration should be given to the possibility that various forms of simulations, imitations, and duplications of handwriting can be generated by computer and other means.

6. Equipment and Requirements

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

NOTE 3—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 in a variety of situations.

6.2 Magnification sufficient to allow fine detail to be distinguished.

6.3 Other apparatus as appropriate.

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, 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 the examination is a comparison of questioned writing to known writing or a comparison of questioned writing to questioned writing.

7.5 Determine whether the questioned writing is original writing. If it is not original writing, request the original.

NOTE 4—Examination of the original questioned writing is preferable.

7.5.1 If the original is not submitted, evaluate the quality of the best available reproduction to determine whether the significant details of the writing have been reproduced with sufficient clarity for comparison purposes and proceed to the extent possible. If the writing has not been reproduced with sufficient clarity for comparison purposes, discontinue these procedures and report accordingly.

7.6 Determine whether the questioned writing appears to be distorted. If it appears to be distorted, determine whether it is possible to establish that the apparently distorted writing is natural writing.

7.6.1 If it is not natural writing, or if it is not possible to establish whether the apparently distorted writing is natural writing, determine whether the apparently distorted writing is suitable for comparison and proceed to the extent possible. If the available questioned writing is not suitable for comparison, discontinue these procedures and report accordingly.

7.7 Evaluate the questioned writing for the following:

7.7.1 *Type of Writing*—If there is more than one type of writing within the questioned writing, separate the questioned writing into groups of single types of writing.

7.7.2 *Internal Consistency*—If there are inconsistencies within any one of the groups created in 7.7.1 (for example, suggestive of multiple writers), divide the group(s) into sub-groups, each one of which is consistent.

7.7.3 Determine range of variation of the writing for each group or sub-group of the questioned writing created in 7.7.1 and 7.7.2.

7.7.4 Determine presence or absence of individualizing characteristics.

7.7.5 If the examination is a comparison of exclusively questioned writing, go to 7.12.

7.8 Determine whether the known writing is original writing. If it is not original writing, request the original.

NOTE 5—Examination of the original known writing is preferable.

7.8.1 If the original is not submitted, evaluate the quality of the best available reproduction to determine whether the significant details of the writing have been reproduced with sufficient clarity for comparison purposes and proceed to the extent possible. If the writing has not been reproduced with sufficient clarity for comparison purposes, discontinue these procedures and report accordingly.

7.9 Determine whether the known writing appears to be distorted. If it appears to be distorted, determine whether it is possible to establish that the apparently distorted writing is natural writing.

7.9.1 If it is not natural writing, or if it is not possible to establish whether the apparently distorted writing is natural writing, determine whether the apparently distorted writing is suitable for comparison and proceed to the extent possible. It should be determined whether additional known writing would be of assistance, and if so, it should be requested. If the available known writing is not suitable for comparison, discontinue these procedures and report accordingly.

7.10 Evaluate the known writing for the following:

7.10.1 *Type of Writing*—If there is more than one type of writing within the known writing, separate the known writing into groups of single types of writing.

7.10.2 *Internal Consistency*—If there are unresolved inconsistencies within any of the groups created in 7.10.1 (for example, suggestive of multiple writers), contact the submitter for authentication. If any inconsistencies are not resolved to the examiner's satisfaction, discontinue these procedures for the affected group(s), and report accordingly.

7.10.3 Determine range of variation of the writing for each group of the known writing created in 7.10.1 and 7.10.2.

7.10.4 Determine presence or absence of individualizing characteristics.

7.11 Evaluate the comparability of the bodies of writing (questioned writing to known writing or exclusively questioned writing).

7.11.1 If the bodies of writing are not comparable, discontinue comparison and request comparable known writing, if appropriate.

7.11.1.1 If comparable known writing is made available, return to 7.10. If comparable known writing is not made available, discontinue these procedures and report accordingly.

7.12 Conduct a side-by-side comparison of comparable portions of the bodies of writing.

7.12.1 Determine whether there are differences, absent characters, and similarities.

7.12.2 Evaluate their significance individually and in combination.

7.12.3 Determine if there is a sufficient quantity of writing (questioned writing, or known writing, or both).

7.12.3.1 If writing (questioned writing, or known writing, or both) is not sufficient in quantity for an elimination or an identification, continue the comparison to the extent possible. When appropriate, request more known writing. If more known writing is made available, return to 7.10.

7.12.4 Analyze, compare, and evaluate the individualizing characteristics and other potentially significant features present in the comparable portions of the bodies of writing.

NOTE 6—Among the features to be considered are elements of the writing such as abbreviation; alignment; arrangement, formatting, and positioning; capitalization; connectedness and disconnectedness; cross strokes and dots, diacritics and punctuation; direction of strokes; disguise; embellishments; formation; freedom of execution; handedness; legibility; line quality; method of production; pen hold and pen position; overall pressure and patterns of pressure emphasis; proportion; simplification; size; skill; slant or slope; spacing; speed; initial, connecting, and terminal strokes; system; tremor; type of writing; and range of variation.

Other features such as lifts, stops and hesitations of the writing instrument; patching and retouching; slow, drawn quality of the line; unnatural tremor; and guide lines of various forms should be evaluated when present.

Potential limiting factors such as age; illness or injury; medication, drugs or alcohol (intoxication or withdrawal); awkward writing position; cold or heat; fatigue; haste or carelessness; nervousness; nature of the document, use of the unaccustomed hand; deliberate attempt at disguise or auto-forgery should be considered.

For further details, see the referenced texts.

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

7.13 Form a conclusion based on results of the above analyses, comparisons, and evaluations.

8. Reporting Conclusions

8.1 The conclusion(s) or opinion(s) resulting from the procedures in this guide may be reached once sufficient examinations have been conducted. The number and nature of the necessary examinations is dependent on the question at hand.

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

8.3 Refer to Terminology E 1658 for reporting conclusion(s) or opinion(s).

9. Keywords

9.1 forensic sciences; handwriting; questioned documents

REFERENCES

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- (3) Hilton, O., *Scientific Examination of Questioned Documents*, New York, Elsevier, 1982.
- (4) Huber, R. A. and Headrick, A. M., *Handwriting Identification: Facts and Fundamentals*, Boca Raton, FL, CRC Press, 1999.
- (5) Osborn, A. S., *Questioned Documents*, 2d ed., Albany, NY, Boyd Printing Co., 1929.

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