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Standard Guide for Examination of Typewritten Items¹

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1. Scope

1.1 This guide covers procedures that should be used by forensic document examiners (Guide E 444) for examinations and comparisons involving typewritten 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 Procedures are also given for taking exemplars from typewriters and the proper handling of typewriters or parts of typewriters that might be relevant.

1.5 These methods can also be applicable (in whole or in part) to examinations of documents prepared on other impact and nonimpact printing devices.

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

1.7 This guide might not cover all aspects of unusual or uncommon examinations of typewritten items.

1.8 This guide cannot replace training (Guide E 2388) or experience and should be used in conjunction with professional judgment.

1.9 The values stated in inch pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.10 *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

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 444 Descriptions of Scope of Work Relating to Forensic Document Examiners

E 1658 Terminology for Expressing Conclusions of Forensic Document Examiners

E 1732 Terminology Relating to Forensic Science

E 2195 Terminology Relating to the Examination of Questioned Documents

E 2287 Guide for Examination of Fracture Patterns and Paper Fiber Impressions on Single-Strike Film Ribbons and Typed Text

E 2388 Guide for Minimum Training Requirements for Forensic Document Examiners

F 221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom

F 909 Terminology Relating to Printers

F 1457 Terminology Relating to Laser Printers

3. Terminology

3.1 For definitions of terms in this Guide, refer to Terminology E 1732 and Terminology E 2195. Some useful definitions of terms can also be found in the other Terminology standards in 2.1.

3.2 Definitions:

3.2.1 *ball element, n*—an element used in a single element typewriter in which the fully formed characters are located on the outer surface of a sphere-like device. Frequently called *golf-ball element*.

3.2.2 *baseline, n*—the ruled or imaginary line upon which typewriting appears to rest.

3.2.3 *carbon paper, n*—a sheet composed of a supporting substrate on one or both sides of which is a coating containing a transferable (usually colored) material. The coating is of such nature that it will transfer in part or entirely to a copy sheet at the point of pressure contact. **F 221**

3.2.4 *character, n*—any language symbol (for example, letter, numeral, punctuation mark, or other sign), other symbol, or ornament. **E 2195**

3.2.5 *character pitch, n*—the number of characters that can be printed in a horizontal 1 in. (25.4 mm). **F 1457**

3.2.6 *character spacing, n*—the width allotted to each character in a fixed pitch (monospacing) typewriter or to the basic unit in a proportional spacing typewriter; usually expressed in millimeters or as a fraction of an inch. Synonym for **horizontal escapement**.

3.2.7 *correctable ribbon*, *n*—a ribbon that produces an image that is designed to be completely removed from the substrate by means of lift-off.

3.2.8 *correction media*, *n*—ribbons, tapes, and sheets designed to be struck by the typeface to cover-up or lift-off typed text.

3.2.9 *cover-up*, *n*—the obliteration of one or more images by means of an opaque material similar in color to the substrate. **F 221**

3.2.10 *daisy wheel element (print wheel)*, *n*—an element used in a typewriter in which the fully formed characters are contained on the ends of finger-like projections radiating out from the center of a disk.

3.2.11 *electric typewriter*, *n*—a typewriter in which an electromechanical device causes the type element to be activated when the keys are struck. **F 909**

3.2.12 *electronic typewriter*, *n*—an electric typewriter in which the keyboard input is received by an electronic processor built into the typewriter. This unit then controls the print head and other features to produce the typing action. **F 909**

3.2.13 *element*, *n*—the interchangeable typeface carrier of a single element typewriter. See **ball element, daisy wheel element, thimble element**.

3.2.14 *fabric ribbon*, *n*—an inked ribbon wherein the substrate is a woven cloth material, such as nylon, cotton, silk, etc. **F 221**

3.2.15 *fixed pitch*, *adj*—describes a character set in which all character cells are of equal width. (See **proportional spacing**.) **F 1457**

3.2.16 *impact printer*, *n*—a printer in which printing is the result of mechanical impacts.

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

3.2.17.1 *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.

3.2.18 *inked ribbon*, *n*—a ribbon composed of a supporting substrate of film, fabric, or paper and a coating or impregnation of a coloring material. The coloring material is of such nature that it will transfer in part or entirely to a copy sheet at the point of pressure contact. **F 221**

3.2.19 *lift-off*, *n*—the removal of one or more images of copy from the substrate by transferring to an intermediate member. **F 221**

3.2.20 *line spacing*, *n*—the distance between successive lines of text, usually measured from baseline to baseline, and usually expressed in millimeters or as lines per inch for typewritten text. Synonym for **vertical escapement**.

3.2.21 *manual typewriter*, *n*—a typewriter whose operation depends solely upon the mechanical action powered by the operator.

3.2.22 *monospacing*, *n*—see **fixed pitch**.

3.2.23 *multi-strike film ribbon*, *n*—a ribbon wherein the substrate film such as polyester is coated or impregnated with an ink which allows several different imprints to be made from multiple overstrikes on the same location on the ribbon, and

still result in full characters being printed. **F 221**

3.2.24 *nonimpact printer*, *n*—a printer in which image formation is not the result of mechanical impacts. **F 909**

3.2.25 *original typed text*, *n*—typed text imprinted onto the surface of a substrate as the result of the impact of a typeface.

3.2.26 *printer*, *n*—an output unit that produces durable hard-copy record of data in the form of a sequence of discrete graphic characters belonging to a predetermined character set. **F 909**

3.2.27 *proportional spacing*, *n*—a system of printing where the character spacing is set in accordance with the character width. See **fixed pitch**.

3.2.28 *single element typewriter*, *n*—a typewriter that generates text via interchangeable “elements” that each contain a full set of characters.

3.2.29 *single-strike film ribbon*, *n*—an inked ribbon wherein the substrate is a plastic film material such as polyethylene, where each area of the ribbon is capable of producing only one image. **F 221**

3.2.30 *single-strike paper ribbon*, *n*—an inked ribbon wherein the substrate is paper, where each area of the ribbon is capable of producing only one image. **F 221**

3.2.31 *thimble element*, *n*—an element used in a typewriter in which the fully formed characters are located on the ends of finger-like devices that are similar to a daisy wheel except that the device is formed to produce a cup-like or thimble structure.

3.2.32 *thread count*, *n*—the total number of warp and filling threads in one square inch of fabric. **F 221**

3.2.33 *typebar*, *n*—a bar, mounted on a typewriter, that holds a type slug(s).

3.2.34 *type element*, *n*—see **element**.

3.2.35 *typeface*, *n*—the portion of the element or type slug that projects from the body and contacts the surface of the substrate to form the character.

3.2.36 *type slug*, *n*—the block (usually metal) attached to the end of the typebar that bears the typeface.

3.2.37 *typestyle*, *n*—a particular variant of a type design.

3.2.38 *typestyle classification scheme*, *n*—a hierarchical taxonomic schematic, key, or computer database that can be used to determine the source of a particular typestyle.

3.2.38.1 *Discussion*—These schemes are only an aid for searching a typestyle library and are not a substitute for actual reference materials in the typestyle library.

3.2.39 *typestyle library*, *n*—an organized collection of reference samples of typestyles and related materials.

3.2.39.1 *Discussion*—Reference materials can also include information such as typestyle catalogs, treatises relative to typography and the design of typestyles used on typewriters and other printing systems, typewriters, type slugs, type elements, actual strike-ups, and instruction and repair manuals. Available relevant data on each typestyle should be collected and maintained.

3.2.40 *typewriter*, *n*—a self-contained machine for character-by-character direct writing by means of keyboard-operated typefaces.

3.3 *Definitions of Terms Specific to This Standard:*

3.4 *alignment, n*—the adjustment of various mechanisms of a typewriter to ensure the even printing of the characters and their proper positioning relative to the baseline and to the other characters.

3.5 *alignment defect, n*—a deviation from the intended appearance or position of a character relative to another character. see **impression defect, motion defect**.

3.5.1 *Discussion*—Alignment defects are usually categorized as vertical misalignment (character too high or low relative to the baseline established by the other characters), horizontal misalignment (character too far to the left or right relative to other characters), and twisted or leaning (character leans to the left or to the right); because they are corrected in the alignment process, impression defects are considered as alignment defects.

3.6 *bead defect, n*—inked or uninked impression or hole in the paper caused by a contaminant particle encased in plating material located on or adjacent to the printing area of the typeface on a metal coated element.

3.7 *family (of type), n*—a class of type designs sharing basic qualities of style and artistic expression that differentiate it from other similar designs.

3.8 *flashing, n*—excess material from the molding process.

3.9 *impression defect, n*—a deviation from the intended evenness in appearance of a character over the entire impression of the character or relative to the impression of another character. (see **off-foot**.)

3.10 *motion (as related to typebar typewriters), n*—the distance traveled by the mechanism for case shifting (usually by the typebar segment or the carriage) and the corresponding separation of the characters on the type slug.

3.11 *motion defect (as related to typebar typewriters), n*—a deviation from the intended evenness in appearance of the baseline alignment of unshifted characters relative to shifted characters.

3.12 *off-foot, n*—the lack of desired and optimum uniformity of contact between the typeface and the substrate.

3.12.1 *Discussion*—While the on-feet adjustment of the typewriter evens the impression of the upper and lower portions of all the characters, this term is also applied to uneven impressions that are heavier or lighter on the sides or corners (usually due to misalignment or distortion of individual typebars).

3.13 *on-feet, n*—the desired and optimum uniformity of contact between the typeface and the substrate

3.14 *on-feet adjustment, n*—the positioning and setting of various mechanisms of a typewriter to ensure the even printing of the upper and lower portions of the characters.

3.15 *rebound, n*—a double impression of a typed character, the second lighter than and overlapping the first.

3.16 *typeface defect, n*—deviation from the intended appearance of a character due to physical damage to the typeface or its malformation in manufacture.

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 the source of the item(s) examined.

4.2 The examinations described in this guide pertain to those documents prepared on typewriters and can consist of a wide range of forensic examinations. Some or all of these procedures can also be applicable to examinations of documents prepared on other impact and nonimpact printing devices.

4.2.1 Examinations can be conducted to classify a typestyle and to determine the possible make and model of typewriter(s) by comparison with a typestyle library.

4.2.2 Examinations and comparisons of typewritten documents can be conducted for the purpose of determining whether or not they are from a common source.

4.2.3 Examinations and comparisons of typewritten documents may be conducted for the purpose of determining whether or not they were produced using a particular typewriter or type element.

4.2.4 Examinations and comparisons of a typewritten document(s) with a typewriter (or particular part(s) of a typewriter) or type element can be conducted for the purpose of determining whether or not a document was prepared with that equipment.

4.2.5 Examinations and comparisons of a typewritten document(s) with typewritten documents of known date can be conducted for the purpose of determining whether or not a document was prepared on or about the date indicated.

4.2.6 Examinations of typewritten documents can be conducted for the purpose of determining whether or not a document was typed in a single, continuous operation.

4.2.7 Examinations of typewriter ribbons or correction media (see lift-off and cover-up), or both, can be conducted to determine the content or source of the material typed on them or corrected with them, respectively.

5. Interferences

5.1 Items submitted for examination can 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 nonoriginal documents, or condition of the items submitted for examination. Other limitations can come from the quantity or comparability of the material submitted, or from 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) can 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.

5.4 Consideration should be given to the possibility that various forms of simulations, imitations, and duplications of typewriting 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.