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Forensic Document Examination Terms and Definitions

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Forensic Document Examination Terms and Definitions

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Foreword

For over a century general and task specific terminologies and glossaries relating to forensic document examination have been presented in textbooks, technical papers, as well as in technical standards such those available through SWGDOC.¹ This Technical Report continues, consolidates, and updates those efforts.

The use of standardized terminology by forensic document examiners and other forensic service providers promotes consistency across jurisdictions and relieves the judicial system of conflicting terms and definitions.

The American Academy of Forensic Sciences established the Academy Standards Board (ASB) in 2015 with a vision of safeguarding Justice, Integrity and Fairness through Consensus Based American National Standards. To that end, the ASB develops consensus based forensic standards within a framework accredited by the American National Standards Institute (ANSI), and provides training to support those standards. ASB values integrity, scientific rigor, openness, due process, collaboration, excellence, diversity and inclusion. ASB is dedicated to developing and making freely accessible the highest quality documentary forensic science consensus Standards, Guidelines, Best Practices, and Technical Reports in a wide range of forensic science disciplines as a service to forensic practitioners and the legal system.

This document was revised, prepared, and finalized as a standard by the Forensic Document Examination Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Forensic Document Examination subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, asb@aafs.org or 410 N 21st Street, Colorado Springs, CO 80904.

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Key Words: *forensic document examination, terminology*

¹ Available at <http://swgdoc.org/index.php/standards/published-standards>

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1 Forensic Document Examination Terms and Definitions

2 1 Scope

3 This technical report provides terms and definitions used by forensic document examiners (FDE) in
4 forensic examinations and comparisons involving the complex and ever-expanding range of issues
5 concerning the forensic examination of documents.

6 The range of terms includes the varied materials, technologies, and methods used to generate
7 documents and those used in their forensic examination.

8 Some terms and definitions in this Technical Report might vary from the usage of other forensic
9 disciplines. This technical report may not cover every definition conceivably used by FDEs.

10 2 Normative References

11 There are no normative reference documents. See Annex A for bibliographical references.

12 3 Terms and Definitions

13 3.1 General Terms Relevant to Forensic Document Examinations

14 3.1.1 15 absent character

16 A character or character combination which is present in one body of writing but is not present (for
17 example, does not have a corresponding character) in another body of writing.
18 (SWGDOC E01)

19 3.1.2 20 accidental characteristic

21 An outlier of a writer's characteristic habits or abilities One that falls outside of the writer's range of
22 variation, and that would not be expected to be repeated in the writing because it may be an
23 anomaly.

24 3.1.3 25 Analysis, Comparison, Evaluation (see individual terms)

26 ACE
27 A summary by Huber (1959) of three distinct stages through which the forensic or other examiner
28 must pass, consciously or otherwise, in the course of any comparative examination.

29 NOTE These terms are similar to "study, comparison and interpretation" and "recognition, comparison and
30 correct interpretation."
31 (Osborn, AS, 1910, pp 89, 105)

32 3.1.3.1 33 analysis

34 The "unknown" item is classified according to its properties or characteristics. These properties
35 can be directly observable, measurable, or inferred.
36 (based on Huber, 1959)

37 **3.1.3.2**

38 **comparison**

39 A comparison is made of the properties of the item found through analysis with the known or
40 recorded properties of others whose identity is unquestioned.
41 (based on Huber, 1959)

42 **3.1.3.3**

43 **evaluation**

44 The process of assessing similarities and dissimilarities in characteristics for **the** purposes of
45 association or dissociation, ~~as determined by the likelihood of occurrence, weight, or~~
46 ~~significance of each.~~

47 **3.1.4**

48 **active coat**

49 A coating layer which contains the primary image (color) forming components.

50 **3.1.5**

51 **aliasing**

52 The stair stepped or jagged effect resulting from analog to digital conversion (see [3.1.294](#)
53 **pixelation**).

54 **3.1.6**

55 **alignment (handwriting)**

56 Position of writing with respect to a real or imaginary baseline.
57 (NIST HF)

58 **3.1.7**

59 **alignment (typewriting)**

60 The adjustment of various mechanisms of a typewriter to ensure the even printing of the characters
61 and their proper positioning relative to the baseline and to the other characters.
62 (SWGDOC E04-13)

63 **3.1.8**

64 **alignment (general)**

65 The appearance or position of a handwritten or printed character(s) or text relative to a real or
66 imaginary baseline or to another handwritten or printed character(s) or text.

67 **3.1.9**

68 **alignment defect**

69 A deviation from the intended appearance or position of a character relative to another character
70 (see [3.1.207 impression defect](#)).

71 NOTE Alignment defects are usually categorized as vertical misalignment (character too high or low relative
72 to the baseline established by the other characters), horizontal misalignment (character too far to the left or
73 right relative to the other characters), and twisted or leaning (character leans to the left or to the right);
74 because they are corrected in the alignment process, impression defects are considered as alignment defects.
75 (SWGDOC E04-13)

- 76 **3.1.10**
 77 **allograph**
 78 Different forms of the same character such as capital hand-printed "A" and cursive "a."
 79 (Adopted from HH)
- 80 **3.1.11**
 81 **alteration**
 82 A modification made to a document by any combination of physical, chemical, or mechanical means
 83 including, but not limited to, obliterations, additions, overwritings, or erasures.
 84 (ANSI/ASB Std 035)
- 85 **3.1.12**
 86 **anti-stokes luminescence**
 87 Photoluminescence whose radiation is located in a spectral region of shorter wavelengths than that
 88 of the exciting radiation.
- 89 NOTE This happens, for instance, when the energy of the emitted photons originates from the absorption of
 90 two exciting photons.
 91 (CIE S 017/E:2011 ILV)
- 92 **3.1.13**
 93 **apex**
 94 The uppermost point of a character.
 95 (SWGDOC T01)
- 96 **3.1.14**
 97 **apprentice**
 98 A student under in-person, direct supervision of a principal trainer on an almost daily basis. There
 99 may or may not be a financial arrangement between the trainer and apprentice.
- 100 **3.1.15**
 101 **apprenticeship**
 102 An arrangement in which a student is learning knowledge, skills, and abilities through practical
 103 experience under a skilled worker(s).
- 104 **3.1.16**
 105 **arcade**
 106 Stroke used to form the arcs of the cursive letters m and n; also a cursive writing
 107 style where upward arc forms predominate. May be referred to as over curve.
- 108 **3.1.17**
 109 **arm**
 110 A stroke that is attached at one end to another portion of the character such as that in
 111 the upper right portion of the upper case "K".
- 112 **3.1.18**
 113 **arrangement (general)**
 114 The placement of handwritten or printed text on the page, including characteristics such as
 115 margins, interline and inter-word spacing, indentations, and paragraphing.
 116 (based on NIST HF)




- 117 **3.1.19**
 118 **artifact**
 119 Any distortion, alteration, or information not present in the original object or image, produced by an
 120 external agent or action, or inadvertently introduced by image copying, capture, processing,
 121 compressions, transmission, display, or printing.
- 122 **3.1.20**
 123 **ascender**
 124 A stroke that rises above the height of the body of the letter formation.
 125 (SWGDOC T01)
- 126 **3.1.21**
 127 **assisted hand signature**
 128 A signature executed by a writer while the writer's hand, arm, or writing instrument is **supported,**
 129 **steadied,** or stabilized by another **resulting in a distorted signature.** (See [3.1.189](#) **guided**
 130 **signature.**)
 131 (SWGDOC T01)
- 132 **3.1.22**
 133 **authorized document**
 134 a document made or issued by or under the authority of a governmental or private organization or
 135 an individual.
- 136 **3.1.23**
 137 **awkward hand**
 138 (See [3.1.419](#) **unaccustomed hand.**)
 139 (SWGDOC T01)
- 140 **3.1.24**
 141 **ball element**
 142 An element used in a single element typewriter in which the fully formed
 143 characters are located on the outer surface of a spherelike device.
 144 Frequently called golf ball element.
 145 (SWGDOC E04-13)
- 146 **3.1.25**
 147 **ballpoint pen ink**
 148 Writing or marking media intended for use in a ball point pen. Typically, a thick, high viscosity ink
 149 with an oil, glycol, or rubber base.
 150 (SWGDOC M01)
- 151 **3.1.26**
 152 **ball terminal – typewriting**
 153 Small round globe on some typefaces.
- 154 **3.1.27**
 155 **banding**
 156 Uniform density variations or voids in a given color which appear in the direction that the printhead
 157 travels.
 158 (ASTM F1857)



- 159 **3.1.28**
 160 **base**
 161 The lowest element of letters such as the capital letters “E” and “L”.
- 162 **3.1.29**
 163 **baseline**
 164 The ruled or imaginary line upon which writing, typographic printing, or typewriting appears to
 165 rest.
- 166 **3.1.30**
 167 **batch to batch variation**
 168 Within an ink formulation, difference in the concentration of a component of an ink formula due to
 169 deviations during production that are within the manufacturer’s tolerance limit.
 170 (SWGDOC M01)
- 171 **3.1.31**
 172 **bead defect**
 173 Inked or un-inked impression or hole in the paper caused by a contaminant particle encased in
 174 plating material located on or adjacent to the printing area of the typeface on a metal coated
 175 element.
 176 (SWGDOC E04)
- 177 ~~**3.1.32**~~
 178 ~~**bias**~~
 179 ~~A general term for any tendency of a person or instrument to deviate systematically from an actual~~
 180 ~~value in making a measurement or rendering a judgment.~~
- 181 **3.1.32**
 182 **bias**
 183 Any factor that has the potential of causing systematic deviation from any part of an evaluative
 184 process.
- 185 **3.1.33**
 186 **bias, cognitive**
 187 The effect of a set of influences, which can be unconscious, on the reliability and validity of an
 188 individual’s observations and conclusions.
- 189 **3.1.34**
 190 **bias, confirmation**
 191 The tendency to search for data or interpret information in a manner, which can be unconscious,
 192 that supports one’s preconceptions, expectations or desires.
- 193 **3.1.35**
 194 **bias, contextual**
 195 Arising from an individual'sA deviation in human judgment caused by exposure to or knowledge of
 196 task-irrelevant information when performing athat is either irrelevant to the judgmental task or
 197 inappropriate for consideration.

- 198 **3.1.36**
199 **black write**
200 Process in electrostatic printing in which the photoconductive element is charged with a charge of
201 the same sign as that of the toner. A light beam, used like a “stylus” is used to discharge only those
202 areas that are to receive toner to form the image. In the development process, the charged
203 background areas repel the like charged toner to the discharged areas on the photoconductor.
204 (ASTM F909)
- 205 **3.1.37**
206 **bleed**
207 Ink feathering of one color into an adjacent color over time.
208 (ASTM F1857)
- 209 **3.1.38**
210 **blemish**
211 A small extraneous spot found near inked regions of checkwriter impressions that is characteristic
212 of machines that use ribbons as their ink source.
213 (SWGDOC E07)
- 214 **3.1.39**
215 **blunt ending**
216 Effect on commencement and terminal strokes of letters, both uppercase and lowercase, by the
217 application of the writing instrument to the paper prior to the beginning of any horizontal
218 movement; an action that usually omits any beard, hitch, knob, or tick.
219 (H & H Glossary)
- 220 **3.1.40**
221 **boat**
222 A dish-shaped figure consisting of a concave stroke and straight or curved stroke sometimes
223 forming the base of letters.
- 224 **3.1.41**
225 **bone folder**
226 A piece of shaped bone or other material, such as plastic or Teflon, typically used by bookbinders to
227 crease paper and to separate pieces of paper that are stuck together.
228 (SWGDOC P01)
- 229 **3.1.42**
230 **bowl**
231 A curved stroke joining a stem that partially encloses an area forming an open cup-like shape.
- 232 **3.1.43**
233 **buckle**
234 The eyelet that is often used to form the middle of such letters as the cursive capital letters “K”, “R”,
235 and “B”, where an element of a letter connects, abuts, or is closely adjacent to the staff.
- 236 **3.1.44**
237 **bulletin**
238 Type designs with a cap height greater than the height of the Roman type, usually used with a
239 horizontal spacing of 3.5 mm or more per character or space (greater than or equal to 8 pitch).

- 240 **3.1.45**
241 **cap**
242 The uppermost element of letters such as the capital letters “F” and “T”.
- 243 **3.1.46**
244 **caps height-typewriting**
245 Height of a font’s uppercase letters, measured by the letter “H”.
- 246 **3.1.47**
247 **carbon paper**
248 A sheet composed of a supporting substrate on one or both sides of which is a coating containing a
249 transferable (usually colored) material. The coating is of such nature that it will transfer in part or
250 entirely to a copy sheet at the point of pressure contact.
251 (ASTM F221)
- 252 **3.1.48**
253 **case file**
254 All case notes, correspondence provided by interested parties, images of submitted documents,
255 billing and time sheets (where applicable), and any task-irrelevant information received. This file
256 may be wholly or partially in an electronic format.
- 257 **3.1.49**
258 **case notes**
259 **examination notes**
260 The record of procedures, standards, controls and instruments used, observations made, results of
261 tests conducted, charts, graphs, images, audio, video, and other documentation generated during
262 the examiner’s analysis. This also includes any resulting findings, opinions, and conclusions.
- 263 **3.1.50**
264 **certified reference material**
265 **CRM**
266 Reference material, accompanied by documentation issued by an authoritative body and providing
267 one or more specified property values with associated uncertainties and traceabilities, using valid
268 procedures.
269 (JCGM 200:2012)
- 270 **3.1.51**
271 **character**
272 Any language symbol (for example, letter, numeral, punctuation mark, or other sign), other symbol,
273 or ornament.
274 (SWGDOC E01)
- 275 **3.1.52**
276 **character pitch**
277 The number of characters that can be printed in a horizontal 1 in. (25.4 mm).
278 (ASTM F1457)
- 279 **3.1.53**
280 **character spacing**

281 **horizontal escapement**

282 The width allotted to each character in a fixed pitch (monospacing) typewriter or to the basic unit
283 in a proportional spacing typewriter; usually expressed in millimeters or as a fraction of an inch.
284 (SWGDOC E04)

285 **3.1.54**

286 **characteristic**

287 A feature, quality, attribute, or property of an item.
288 (SWGDOC E01)

289 **3.1.55**

290 **characteristic, class**

291 A feature determined prior to manufacture that is intended to be present in a particular form in
292 every member of a group and can be used to define that group (e.g., a copybook style of writing, a
293 specific type style, print process).

294 **3.1.56**

295 **characteristic, common (handwriting)**

296 A feature found in a similar, but not necessarily exact, form in the handwriting of individuals who
297 are not members of a definable group and is not attributable to the study of a particular
298 handwriting system.

299 **3.1.57**

300 **characteristic, group (handwriting)**

301 A feature found in a similar, but not necessarily exact, form in the handwriting of individuals who
302 are members of a definable group and is not attributable to the study of a particular handwriting
303 system.

304 **3.1.58**

305 **characteristic, (individual, distinguishing) (non-handwriting)**

306 A deviation from a class characteristic that would be present only by chance in another member of
307 the class.

308 **3.1.59**

309 **characteristic, (individual, distinguishing) (handwriting)**

310 A feature found in handwriting that is not attributable to a class of writing and it is not taught. Only
311 in combination would this characteristic(s) distinguish class from non-class.

312 **3.1.60**

313 **characteristic, subclass (non-handwriting)**

314 A feature, determined prior to manufacture, that is intended to be present in a particular form in
315 every member of a sub-group within a class and can be used to define that sub-group.

316 **3.1.61**

317 **characteristic, system (handwriting)**

318 A feature found in an individual's handwriting that is attributable to the study of a particular
319 handwriting system.

- 320 **3.1.62**
321 **characteristic, transitory**
322 A feature or defect that can be modified over time or removed entirely by use, cleaning,
323 replacement, or repair.
- 324 **3.1.63**
325 **charred documents**
326 Items damaged by heat or fire.
327 (SWGDOC P01)
- 328 **3.1.64**
329 **checkwriter**
330 A device manually or electrically powered or computer generated, designed to ink, emboss, print,
331 perforate, or shred a monetary value, along with other peripheral information, onto a document.
332 (SWGDOC E07)
- 333 **3.1.65**
334 **chromatography**
335 A method of separating substances that is widely used in analytical and preparatory chemistry. It
336 involves the flow of a liquid or gas mobile phase over a solid or liquid stationary phase. As the
337 mobile phase flows past the stationary phase, a solute will undergo repeated adsorption and
338 desorption and move along at a rate depending, among other factors, on its ratio of distribution
339 between the two phases. If their distribution ratios are sufficiently different, components of a
340 mixture will migrate at different rates and produce a characteristic pattern (chromatogram).
341 (SWGDOC M01)
- 342 **3.1.66**
343 **circularity**
344 Ratio of a single ink dot height divided by its width with 1.0 being a perfect circle.
345 (ASTM F1857)
- 346 **3.1.67**
347 **class defect**
348 **common defect**
349 A deviation from a class characteristic that is present in a similar, but not necessarily exact, manner
350 in a significant number, even most, but not all, of the members of a class or subclass.
- 351 **3.1.68**
352 **closed loop**
353 A loop formation that approximates a retrace, where the sides of the loop run parallel together.
- 354 **3.1.69**
355 **coalescence**
356 Puddling or pooling of adjacent ink drops on the substrate before they can be dried or absorbed
357 resulting in non-uniformity of color density.
358 (ASTM F1857- Withdrawn 2020)

- 359 **3.1.70**
 360 **cockle**
 361 Of paper, a defective, puckered condition of a paper sheet as a result of nonuniform hygroexpansion
 362 which can be related to any nonuniformity in the sheet, including mass distribution and drying
 363 stresses.
 364 (ASTM D1968)
- 365 **3.1.71**
 366 **coincidental peripheral printing**
 367 Resulting from an impression of unintended printing areas, often on the periphery, of a stamp. This
 368 may be due to the manufacturing process or the stamping technique.
 369 (SWGDOC E10)
- 370 **3.1.72**
 371 **collapsed side**
 372 Occurs in the formation of the cursive letters “m” and “n” when the left or right arcade is formed as a
 373 retrace or near retrace movement.
- 374 **3.1.73**
 375 **collate**
 376 1) Analyze and compare to identify points of agreement and difference; critical comparison or side
 377 by side examination.
 378 2) Arrange paper in the proper sequence, such as by photocopiers.
- 379 **3.1.74**
 380 **collected writing**
 381 **handwritten standard**
 382 A subset of known writing. Samples of a known person’s handwriting/signatures that have been
 383 produced throughout the course of day-to-day business, are typically not related to the case at hand,
 384 and have been collected for the purposes of comparison against questioned material. Examples
 385 include letters, diaries, business records, forms, or checks. These are also known as normal course
 386 specimens, course of business specimens, or undictated writing.
- 387 **3.1.75**
 388 **color-shifting ink**
 389 An ink that reflects various wavelengths of white light differently, depending on the angle of
 390 incidence to the surface.
- 391 **3.1.76**
 392 **common writership**
 393 A document or group of documents that have been written by the same individual. ³
 394
- 395 NOTE The term “common authorship” is sometimes used, but it is deprecated because authorship is
 396 becoming recognized as the originator of the words/ideas, as opposed to the physical writing of a document.
- 397 **3.1.77**
 398 **comparable (general)**
 399 Pertaining to items that contain the same type(s) of characteristic or features, singularly or in
 400 combination.

- 401 **3.1.78**
402 **comparable (handwriting)**
403 Pertaining to handwritten items that contain the same type(s) of writing and similar characters,
404 words, and combinations. Contemporaneousness and writing instruments may also be factors.
405 (SWGDOC E01)
- 406 **3.1.79**
407 **competency**
408 Possessing and demonstrating the requisite knowledge, skills, and abilities to successfully perform
409 a specific forensic document examination task, as per ANSI standards.
- 410 **3.1.80**
411 **complexity**
412 A combination of speed, skill, style, and construction that contributes to handwriting being difficult
413 to simulate.
414 (NIST HF)
- 415 **3.1.81**
416 **conclusion**
417 A judgement or decision reached by reasoning based on the examination and evaluation of all
418 observations, findings, and available task relevant information.
- 419 NOTE Conclusions expressed by forensic document examiners are expert opinions based on the
420 characteristics, features, or information under observation and interpreted using the training, knowledge,
421 skills, abilities, and experience of a specific forensic document examiner.
- 422 **3.1.82**
423 **conclusion, classification**
424 A conclusion in which an examiner is assessing the type or classification of a single item (e.g.,
425 whether a document was produced by a particular printing process, typed by the same typewriter).
- 426 **3.1.83**
427 **conclusions, source**
428 Conclusions in which an examiner is assessing at least two opposing propositions: whether or not
429 two (or more) items came from the same source (e.g., whether unknown and known items came
430 from the same source), or whether or not one (or more) item(s) came from a specific source (e.g.,
431 whether a typewritten document was produced by a specific typewriter).
- 432 **3.1.84**
433 **connecting stroke**
434 A line joining two adjacent characters.
435 (SWGDOC T01)
- 436 **3.1.85**
437 **connections**
438 The union of two characters e.g., in cursive writing.
439 (Modular Method)

- 440 **3.1.86**
441 **contemporaneous writing**
442 A document or a sample of writing that was prepared around or about the same timeframe as the
443 document in question. The timeframe may be determined by the task at hand.
- 444 **3.1.87**
445 **continuous spray**
446 Ink jet technology where drops are generated at a regular unbroken rate. Images are then generated
447 by deflections of the ink droplets after they are charged so they are either intercepted by a catcher
448 and not permitted to impact the substrate or deflected to intercept the substrate at specific
449 locations.
450 (SWGDOC E06)
- 451 **3.1.88**
452 **continuous tone**
453 A characteristic of an image such that it has all the values (0% to 100%) of gray (black and white) or
454 color in it. A continuous tone can be approximated by the use of thousands or millions of
455 gradations of black and white or colors.
- 456 **3.1.89**
457 **conventional printing**
458 A group of processes that utilize printing plates and fall into four categories including planographic,
459 relief, intaglio, and screen printing methods.
- 460 **3.1.90**
461 **copybook**
462 A manual of writing instruction that provides models to be copied by the student.
- 463 **3.1.91**
464 **corona**
465 Device used to place a uniform electrical charge on the surface of a xerographic photoreceptor.
466 (ASTM F1457)
- 467 **3.1.92**
468 **correctable ribbon**
469 A ribbon that produces an image that is designed to allow for the removal of the image from the
470 substrate by means of liftoff correction media.
- 471 **3.1.93**
472 **correction media**
473 Ribbons, tapes, and sheets designed to be struck by the typeface to coverup or liftoff typed text.
474 (SWGDOC E04)
- 475 **3.1.94**
476 **counter (manually or machine produced)**
477 An enclosed or partially enclosed space inside a letterform or symbol, e.g., “O”, “p”, “e” and “g” or
478 forms such as “G” and “c”.

- 479 **3.1.95**
480 **counterfeit document**
481 A document that purports to be genuine but is not, because it has been falsely made or
482 manufactured in its entirety.[18 USC 513 (c) (1)]
- 483 NOTE A counterfeit document is an attempt to create an exact copy of a document that exists (e.g., trying to
484 recreate the US passport including all security features). A fabricated document is completely fictitious (e.g.,
485 creating a passport from a country that is fictitious). A forged document alters or changes a genuine
486 document (e.g., altering the photo, name, or date on an existing passport).
- 487 **3.1.96**
488 **coverup**
489 Obliteration of text or images by means of an opaque material.
- 490 **3.1.97**
491 **coverup correction**
492 (See [3.1.275 overprint correction](#).)
493 (SWGDOC E11)
- 494 **3.1.98**
495 **cracking**
496 Condition in which ink that has been absorbed into a substrate causes the coating to shrink to a
497 state much smaller than the original coating dimension causing fractures in the image area.
498 (SWGDOC E06-13)
- 499 **3.1.99**
500 **cross mark**
501 Usually an “x” used as a signature and, if witnessed, may be legally binding. Also known as “His
502 Mark”.
- 503 **3.1.100**
504 **cross stroke**
505 A stroke that crosses another portion of the character and is not attached at either end (for
506 example, the horizontal stroke of the “t”) (see [3.1.101 crossbar](#)).
507 (SWGDOC T01)
- 508 **3.1.101**
509 **crossbar**
510 A stroke that intersects other portions of the character at both ends (see [3.1.17 arm](#) and [3.1.100](#)
511 **cross stroke**).
512 (SWGDOC T01)
- 513 **3.1.102**
514 **crystallization**
515 Condition in which ink evaporates and forms crystals.
516 (SWGDOC E06-13)

- 517 **3.1.103**
 518 **cursive**
 519 A type of writing in which the letters are joined and the writing instrument is not lifted after most
 520 strokes.
 521 (SWGDOC T01)
- 522 **3.1.104**
 523 **daisy wheel element**
 524 **print wheel**
 525 An element used in typewriters or computer printers in which the fully formed characters are
 526 contained on the ends of fingerlike projections radiating out from the center of a disk.
 527 (SWGDOC E04-13)
- 528 **3.1.105**
 529 **defect, subclass**
 530 A feature not determined prior to manufacture that is an unintended deviation from a class
 531 characteristic, which is present in a particular form in all members of a definable sub-group of items
 532 within a class, generally caused by one or more Randomly Acquired Characteristics (RAC) of the
 533 tool(s) or equipment producing the items while in the same approximate condition.
- 534 **3.1.106**
 535 **descender**
 536 A stroke that extends below the baseline of the body of the letter formation.
 537 (SWGDOC T01)
- 538 **3.1.107**
 539 **detached letter**
 540 A letter, which when alone, constitutes a word, such as "I" and "A". Also, a letter which is not
 541 connected to the remaining letters of a word, such as the capital letter in some names.
- 542 **3.1.108**
 543 **diacritic**
 544 Those dots, lines, and swoops that appear above, below, and occasionally even
 545 beside certain letters in words. The purpose of diacritical marks is to change the
 546 sound of the individual letter they are marking or to change the meaning of an
 547 entire word by changing which syllable is accented. Often incorrectly used to
 548 describe such characteristics as the "i" and "j" dot.
- 549 **3.1.109**
 550 **diagonal stroke**
 551 A slanting stroke, as in the center stroke of the printed capital "N".
- 552 **3.1.110**
 553 **dichroic filters**
 554 A filter with two transmission bands. These bands are usually widely separated, and can be of
 555 significantly different size.
 556 (SWGDOC M01)



Déjà vu

- 557 **3.1.111**
558 **dielectric printing process**
559 Nonimpact printing technique in which specially treated paper consisting of a conductive base layer
560 coated with a nonconductive thermoplastic material is used to hold an electric charge usually
561 applied directly by a set of electrode styli. The electric charge corresponds to the latent image of the
562 original. Following the charging step, the paper is imaged by a toner system similar to that of
563 electrostatic copying devices. This technique is sometimes called electrographic, and is currently
564 used on general purpose non-impact printers, plotting and facsimile devices.
565 (SWGDOC E05)
- 566 **3.1.112**
567 **difference**
568 Consistent, repeated dissimilarity in a structural or other characteristic or feature, that cannot be
569 reasonably explained as variation or deviation from natural variation of a single source or class.
- 570 **3.1.113**
571 **diffuse reflection**
572 Diffusion by reflection in which, on the macroscopic scale, there is no regular reflection.
573 (CIE S 017/E:2011 ILV)
- 574 **3.1.114**
575 **digital image**
576 An image that is represented by discrete numerical values organized in a two-dimensional array;
577 when viewed on a monitor, projected image or printed on paper, it appears similar to a photograph.
578 (SWGIT/SWGDE)
- 579 **3.1.115**
580 **digital image processing**
581 Any activity that transforms a digital image.
582 (SWGDOC E03) (ANSI/ASB Std 035)
- 583 **3.1.116**
584 **digital printing**
585 A method of printing from a digital-based image directly to a variety of media.
- 586 **3.1.117**
587 **digital signature**
588 An electronic signature that includes an authentication scheme, such as through the use of public
589 key encryption cryptography.
- 590 **3.1.118**
591 **digitally captured signature**
592 **DCS**
593 The data produced from the capturing of the physical properties of the movement of a handwritten
594 signature in the act, also known as Electronically Captured Signatures, Electronic Handwritten
595 Signature, Biometric Signature.
596
597 NOTE While a digitally captured signature is one kind of an **electronic signature**, it is not synonymous with
598 **digital signature, electronic signature, or eSignature.**

- 599 **3.1.119**
600 **direct contact**
601 Two sheets of paper, one on top of the other, with no intervening sheets.
602 (SWGDOC E02)
- 603 **3.1.120**
604 **direct thermal product**
605 Substrate coated with a heat sensitive formulation for the purpose of creating an image when heat
606 is applied from a thermal printhead.
607 (ASTM F1623).
- 608 **3.1.121**
609 **directional change**
610 A modification in the progress of the written line; such changes can occur as gradual curves, abrupt
611 angles, or curves and retracings.
- 612 **3.1.122**
613 **directional skipping**
614 A skip in a handwritten line that may occur after an abrupt change in the direction of the stroke.
- 615 **3.1.123**
616 **disguised writing**
617 Deliberately altered in an attempt to hide normal writing habits.
- 618 NOTE This is a type of distorted writing and determining the intent between the two remains with the trier of
619 fact.
620 (Modular Method)-]
- 621 **3.1.124**
622 **dissimilarity**
623 A feature or characteristic in one item or group of items that is not in the same form in a
624 comparable item or group of items.
- 625 **3.1.125**
626 **distorted writing**
627 Writing that does not appear to be, but may be natural. This appearance can be due to either
628 voluntary factors (for example, disguise, simulation) or involuntary factors (for example, physical
629 condition of the writer, writing conditions). (NIST HF, SWGDOC E01)
- 630 **3.1.126**
631 **distributed learning**
632 Educational methods that use models of distant or remote education such as video, the internet,
633 networked multimedia, and independent or proctored study models. This does not replace in-
634 person training, but is used to complement that training.
- 635 **3.1.127**
636 **document**
637 Any material containing marks, symbols, or signs visible, partially visible, or invisible (to the naked
638 eye) that may ultimately convey meaning or a message.
639 (Kelly, Lindblom)

640 NOTE This definition of a document is broad; it extends to electronic documents, including e-mail and other
641 electronic communications, word processed documents and databases. In addition to documents that are
642 readily accessible from computer systems and other electronic devices and media, the definition covers those
643 documents that are stored on servers and back-up systems and electronic documents that have been 'deleted';
644 it also extends to additional information stored and associated with electronic documents known as
645 metadata.
646 (Practice Direction 31A – Disclosure and Inspection UK)

647 **3.1.128**

648 **dot matrix**

649 A method of character generation in which each character is formed by a pattern of dots selected
650 from a grid or matrix.

651 **3.1.129**

652 **downstroke**

653 The part of a letter that is made when the writing instrument is moving from the top to the bottom
654 of a letter.

655 **3.1.130**

656 **drag line**

657 **drag stroke**

658 **hairline (handwriting)**

659 A stroke resulting from incomplete lifting of the pen, usually faint in ink coverage. Also, a very thin
660 or light stroke of a writing instrument in areas where its movement is not normally recorded.

661 **3.1.131**

662 **drop on demand**

663 Ink jet technology where drops are generated as needed to create an image.
664 (SWGDOC E06)

665 **3.1.132**

666 **dry letter transfer process**

667 Plastic lettering on specially prepared paper which can be transferred to a substrate by the
668 application of pressure.

669 **3.1.133**

670 **dry seal**

671 A non-inked mechanical device which embosses a design on paper.
672 (SWGDOC E08)

673 **3.1.134**

674 **dry toner**

675 Material in a dry developer system which when deposited on a substrate by the field of an
676 electrostatic charge pattern, becomes the visible record.
677 (SWGDOC E05)

678 **3.1.135**

679 **dual component development**

680 Mixture of dry toner and iron oxide developer that is used for developing electrostatic images in
681 copiers.
682 (SWGDOC E05)


- 683 **3.1.136**
684 **ductus**
685 The direction, sequencing, and speed with which the strokes making up a character are executed.
- 686 **3.1.137**
687 **dye diffusion thermal transfer**
688 **dye sublimation**
689 An imaging process that uses thermal dye ribbons with selected organic dyes, the imaging
690 characteristics of which are different from the pigmented materials used in thermal transfer wax
691 ribbons.
- 692 **3.1.138**
693 **electric typewriter**
694 A typewriter in which an electromechanical device causes the type element to be activated when
695 the keys are struck.
696 (ASTM F909)
- 697 **3.1.139**
698 **electromagnetic radiation**
699 Emission or transfer of energy in the form of electromagnetic waves with the associated photons.
- 700 NOTE The French term “radiation” applies preferably to a single element of any radiation, characterized by
701 one wavelength or one frequency.
702 (CIE S 017/E:2021 ILV)
- 703 **3.1.140**
704 **electronic document**
705 Text, image files, spreadsheets, or other documents generated by computer on any media or device
706 for any electronic processing. Electronically stored documents follow no format or readability
707 requirements except when retrieved for human-use.
- 708 **3.1.141**
709 **electronic signature**
710 **eSignature**
711 Digital data embedded in a digital file for the purposes of authentication, which may consist of a
712 password, a photo, biometric data (DCS, fingerprint, etc.), One-Time-Passwords, voice recording, etc.
- 713 **3.1.142**
714 **electronic typewriter**
715 An electric typewriter in which the keyboard input is received by an electronic processor built into
716 the typewriter. This unit then controls the print head and other features to produce the typing
717 action.
718 (ASTM F909)
- 719 **3.1.143**
720 **electrophotography**
721 A non-impact printing process in which the image is formed using photoconductive paper or a
722 photoconductive intermediate drum.

- 723 **3.1.144**
724 **electrostatic detection device**
725 **EDD**
726 An instrument that uses an electrostatic charge along with toner distribution as the mechanism to
727 visualize paper fiber disturbances (for example, indentations and erasures).
728 (ANSI/ASB Std 044)
- 729 **3.1.145**
730 **element**
731 The interchangeable typeface carrier of a single element typewriter. See [3.1.24](#) **ball element**,
732 [3.1.104](#) **daisy wheel element**, [3.1.399](#) **thimble element**.
733 (SWGDOC E04-13)
- 734 **3.1.146**
735 **embellishments**
736 Flourishes, ornaments, paraphs, rubrics and underscores. It adds or extends strokes that are easily
737 executed and are not essential to the recognition of the character or the word.
738 (NIST HF)
- 739 **3.1.147**
740 **embossment variation**
741 Nonuniformity of the dry seal impression on the paper stock. It can be caused by the manner of
742 application or by defects in the dry seal.
743 (SWGDOC E08)
- 744 **3.1.148**
745 **emission (of radiation)**
746 Release of radiant energy.
747 (CIE S 017/E:2011 ILV)
- 748 **3.1.149**
749 **empty magnification**
750 Occurs when the image continues to be enlarged, but no additional detail is resolved.
- 751 **3.1.150**
752 **enhancement**
753 A process to reveal, intensify, magnify, or clarify an observation. Image enhancement is the process
754 of adjusting a digital image, making it more suitable for display or further image analysis. For
755 example, sharpening or brightening an image.
- 756 **3.1.151**
757 **erasure**
758 The area where material has been removed from a document by chemical, abrasive, or other means.
759 (SWGDOC E03) (ANSI/ASB 035)
- 760 **3.1.152**
761 **evidence**
762 (See [3.1.229](#) **item**.)

- 763 **3.1.153**
764 **examination**
765 The process of observing, searching, detecting, recording, prioritizing, collecting, analyzing,
766 measuring, comparing and/or interpreting.
- 767 **3.1.154**
768 **excitation**
769 Elevation of the energy levels of atoms, molecules or ions to higher energy levels.
770 (CIE S 017/E:2011 ILV)
- 771 **3.1.155**
772 **exclusion**
773 **elimination**
774 The determination that there are sufficient characteristics in disagreement, with no significant
775 limitations, to support an opinion that two or more items did not originate from the same source.
- 776 **3.1.156**
777 **exemplars**
778 Samples of handwriting, printed text, paper, ink, etc., known (or purported) to have been produced
779 by a particular individual, machine, or manufacturer.
- 780 **3.1.157**
781 **external (extrinsic) factors (handwriting)**
782 Writing conditions such as underlying writing surface, substrate, writing implement, writing
783 position, interruptions during the writing activity etc. that affect the handwriting movement or the
784 resulting writing.
785 (NIST HF)
- 786 **3.1.158**
787 **eyelet**
788 Often found in cursive writing, a small oval or loop formation.
- 789 **3.1.159**
790 **fabric ribbon**
791 An inked ribbon wherein the substrate is a woven cloth material, such as nylon, cotton, or silk.
- 792 **3.1.160**
793 **fabricated document (fictitious instrument)**
794 A falsely manufactured document.
- 795 NOTE A counterfeit document is an attempt to create an exact copy of a document that exists (e.g., trying to
796 recreate the US passport including all security features). A fabricated document is completely fictitious (e.g.,
797 creating a passport from a country that is fictitious). A forged document alters or changes a genuine
798 document (e.g., altering the photo, name, or date on an existing passport).
- 799 **3.1.161**
800 **family (of type)**
801 A class of type designs sharing basic qualities of style and artistic expression that differentiate it
802 from other similar designs.
803 (SWGDOC E04)

- 804 **3.1.162**
805 **feathering**
806 The condition in which the writing/printing fluid spreads laterally in a pattern that usually follows
807 the direction of the surface fibers away from the written or printed line.
- 808 **3.1.163**
809 **financial document**
810 An obligation, security, or other document representative of value made or issued by or under the
811 authority of a governmental or private organization.
- 812 **3.1.164**
813 **finding**
814 Information concluded as a result of an examination.
815 (ISO 21043-1:2018)
- 816 **3.1.165**
817 **fixed pitch**
818 Describes a character set in which all character cells are of equal width (see proportional spacing).
819 (ASTM F1457)
- 820 **3.1.166**
821 **fixing film**
822 Clear plastic sheet with a pressure sensitive adhesive layer.
823 (ANSI/ASB Std 044)
- 824 **3.1.167**
825 **flashing**
826 Excess material from a molding process.
827 (SWGDOC E04)
- 828 **3.1.168**
829 **flexography**
830 A form of relief printing like letterpress, but using a flexible rubber or resilient photopolymer relief
831 plate(s).
- 832 **3.1.169**
833 **flourish**
834 A writing movement that is designed to be ornamental.
- 835 **3.1.170**
836 **flow back**
837 An increase in the density of the ink line caused by excess ink running back onto the previous
838 portion of a stroke, occurring as the pen is lifted from the paper.
- 839 **3.1.171**
840 **fluorescence**
841 A process by which radiant flux of certain wavelengths is absorbed and reradiated nonthermally at
842 other, usually longer, wavelengths.
843 (ANSI/ASB Std 035)

- 844 **3.1.172**
845 **foil stamping**
846 Various colored foils made of metals or other materials which are typically combined with
847 embossing or debossing, carried on a plastic sheet, and transferred through a stamping or heated
848 die process on to a substrate.
- 849 **3.1.173**
850 **forensic document examiner**
851 **FDE**
852 A forensic service provider who addresses inquiries that arise in matters where the authenticity,
853 genuineness, or source of a document is questioned, and does not provide personality assessment,
854 creation of a personality profile, or analysis, or judgment of a writer's personality or character.
- 855 **3.1.174**
856 **forensic science**
857 The application of scientific principles and techniques to matters of the law especially as relating to
858 the collection, examination, and analysis of physical evidence.
- 859 **3.1.175**
860 **forensic science practitioner**
861 An individual who (1) applies scientific or technical practices to the recognition, collection, analysis,
862 or interpretation of evidence at issue in criminal, civil, or administrative investigations and
863 proceedings, and (2) issues test results, provides reports, or provides interpretations, conclusions,
864 or opinions through testimony with respect to such evidence.
- 865 **3.1.176**
866 **forged document**
867 A document that purports to be genuine but is not, because it has been falsely altered, completed,
868 signed, or endorsed, or contains a false addition thereto or insertion therein, or is a combination of
869 parts of two or more genuine documents.
870 [18 USC 513 (c) (2)]
871
872 NOTE A counterfeit document is an attempt to create an exact copy of a document that exists (e.g., trying to
873 recreate the US passport including all security features). A fabricated document is completely fictitious (e.g.,
874 creating a passport from a country that is fictitious). A forged document alters or changes a genuine
875 document (e.g., altering the photo, name, or date on an existing passport).
- 876 **3.1.177**
877 **fracture pattern**
878 The spatial arrangement of each complementary edge formation created when a single object is
879 separated into two or more fragments.
880 (SWGDOC E11)
- 881 **3.1.178**
882 **fugitive ink**
883 An ink that will run and/or stain when it comes in contact with water or any aqueous type of
884 solution.

- 885 **3.1.179**
 886 **full color copier/printer**
 887 Office machines that can reproduce color originals containing gradations of color (see [3.1.234 laser](#)
 888 **printer**, [3.1.219 ink jet process](#)).
- 889 **3.1.180**
 890 **fuser roll**
 891 Heated roller that contacts the paper and toner directly and is part of the fuser unit.
 892 (ASTM F1434)
- 893 **3.1.181**
 894 **garland**
 895 A rounded, trough-like stroke such as that in the u; an individual style of
 896 handwriting with a predominance of these types of strokes. May be referred to as
 897 under curve. 
- 898 **3.1.182**
 899 **gel pen ink**
 900 An aqueous ink of high viscosity. Often characterized by tram lines on the outside of the ink line and
 901 a trough on the interior.
- 902 **3.1.183**
 903 **glyphs**
 904 The shapes that characters can have when they are rendered or displayed. In contrast to characters,
 905 glyphs appear on the screen or paper as particular representations of one or more characters. A
 906 repertoire of glyphs makes up a font.
 907 (Unicode 12.0.0, 2.2)
- 908 **3.1.184**
 909 **gooping**
 910 Extraneous deposits of ink on the document surface caused by built up ink on the housing of ball
 911 point pens, typically found at a point of re-direction of the written line.
- 912 **3.1.185**
 913 **gravure**
 914 An intaglio printing process in which the image area of the printing plate consists of cells or wells
 915 rather than recessed lines.
- 916 **3.1.186**
 917 **ground truth**
 918 Information that is known to be real or true, provided by direct observation and measurement (i.e.,
 919 empirical evidence) as opposed to information provided by inference.
- 920 **3.1.187**
 921 **gripper bar**
 922 **picker bar**
 923 A grabbing device used in the delivery system to transport individual sheets of paper in a printer or
 924 copier.

- 925 **3.1.188**
 926 **gripper marks**
 927 Visible or latent indented features in paper resulting from gripper bars in a printing or copying
 928 system.
- 929 **3.1.189**
 930 **guided signature**
 931 A signature executed while an impaired writer's hand, arm, or writing instrument is controlled by
 932 another resulting in a distorted signature. See assisted hand signature.
- 933 **3.1.190**
 934 **guidelines**
 935 Lines that show a route to follow when simulating handwriting or signatures. These can exist in the
 936 form of pencil lines or indentations or be created by the use of transmitted light shone through a
 937 document containing the entries to be copied.
 938 (NIST HF)
- 939 **3.1.191**
 940 **hairline (typography)**
 941 The thinnest line found in a specific typeface that consists of lines of varying widths, usually
 942 common to serif typefaces.
- 943 **3.1.192**
 944 **halftone**
 945 Print process in which a series of dots of variable diameter and regular interdot spacing is used to
 946 print photographs and drawings.
- 947 **3.1.193**
 948 **hand printing**
 949 A style of writing in which the letters are not joined and the writing instrument is lifted after most
 950 strokes.
 951 (SWGDOC T01)
- 952 **3.1.194**
 953 **handwriting**
 954 Writing in any form (such as cursive, hand printing, signatures, numbers). Although "handwriting,"
 955 is used as a general term, it may be produced by the hand, mouth, foot, or other body part by
 956 directly manipulating a writing instrument.
- 957 **3.1.195**
 958 **hesitation**
 959 A pause in the writing without the instrument being lifted.
 960 (SWGDOC T01)
- 961 **3.1.196**
 962 **hiatus**
 963 In cursive writing, a space caused by lifting the writing instrument at the conclusion of
 964 one letter, followed by the reapplication of the instrument to begin the next letter of a
 965 word; also referred to as a break or pen lift. May be an individualized habit.




- 966 **3.1.197**
967 **identification document**
968 Made or issued by or under the authority of a governmental or private organization which, when
969 completed with information concerning a particular individual, is of a type intended or commonly
970 accepted for the purpose of identification of individuals.
- 971 **3.1.198**
972 **image**
973 A visually observable counterpart of an object produced by means of imaging technology.
974 (SWGDOC D01)
- 975 **3.1.199**
976 **image area**
977 That portion of the page that is printed, including the space between letters and lines.
978 (ASTM F1457)
- 979 **3.1.200**
980 **image enhancement**
981 Any process intended to improve the visual appearance of an image or specific features within an
982 image.
983 (ASTM E2916)
- 984 **3.1.201**
985 **image formation**
986 The elements that comprise an image to include, but not limited to, continuous inked areas, halftone
987 patterns, and dot characteristics.
- 988 **3.1.202**
989 **image density**
990 Contrast between image and background as measured by densitometer.
991 (ASTM F221)
- 992 **3.1.203**
993 **imaging drum**
994 Photoreceptive drum coated with a charge-sensitive material used in the image transfer systems of
995 toner devices.
996 (SWGDOC E05)
- 997 **3.1.204**
998 **imaging film**
999 Thin transparent plastic material that covers the item during an examination using an EDD.
1000 (ANSI/ASB Std 044)
- 1001 **3.1.205**
1002 **impact printer**
1003 A printer in which printing is the result of mechanical impacts (e.g., dot-matrix, typewheel printer).
1004 (SWGDOC E04)

- 1005 **3.1.206**
1006 **impression**
1007 An image formed by pressure.
1008 (SWGDOC E11)
- 1009 **3.1.207**
1010 **impression defect**
1011 A deviation from the intended evenness in appearance of a character over the entire impression of
1012 the character or relative to the impression of another character (see [3.1.266 off-foot](#)).
1013 (SWGDOC E04).
- 1014 **3.1.208**
1015 **impression format**
1016 The manner in which the paper is embossed or shredded.
1017 (SWGDOC E07)
- 1018 **3.1.209**
1019 **inconclusive opinion**
1020 An opinion expressed when an examination has been undertaken, but the FDE is unable to make a
1021 determination with regard to writership or source, for example because of the presence of both
1022 similarities and dissimilarities.
- 1023 **3.1.210**
1024 **indentations**
1025 Latent or visible impressions and/or embossments in paper or other media. This also includes
1026 paper fiber disturbances which do not optically appear as impressions.
1027 (ASB S044-19)
- 1028 **3.1.211**
1029 **indigo printing**
1030 Created directly from digital data, charged ink particles are applied to an imaging drum and then
1031 transferred to a print blanket.
- 1032 **3.1.212**
1033 **indirect contact**
1034 Two sheets of paper, one on top of the other, with one or more intervening sheets.
1035 (SWGDOC E02)
- 1036 **3.1.213**
1037 **individual prefix**
1038 A prefix especially designed for a particular customer.
1039 (SWGDOC E07)
- 1040 **3.1.214**
1041 **individualizing characteristics**
1042 **discriminating characteristics**
1043 Marks or properties that serve to characterize an item(s) and distinguish it from similar item(s).

- 1044 **3.1.215**
1045 **infrared**
1046 **IR**
1047 Referring to radiant flux having wavelengths longer than the wavelengths of visible light, usually
1048 from ~700 nm to 1400 nm (~0.7 μm to 1.4 μm) as per the International Commission on
1049 Illumination (CIE) for IR-A.
1050 (ANSI/ASB Std 035)
- 1051 **3.1.216**
1052 **infrared luminescence**
1053 **IRL**
1054 The emission of radiant energy during a transition from an excited electronic state of an atom,
1055 molecule, or ion to a lower electronic state (fluorescence or phosphorescence, or both), where the
1056 spectrum of the excitation source is in the ultraviolet (UV) or visible region of the electromagnetic
1057 spectrum, or both, and the spectrum of the emitted energy is in the far red or infrared (IR) region of
1058 the electromagnetic spectrum.
1059 (ANSI/ASB Std 035)
- 1060 **3.1.217**
1061 **initial stroke**
1062 Written movement at the beginning of a character. (Also known as beginning or commencement
1063 stroke.)
- 1064 **3.1.218**
1065 **ink formula**
1066 A precise recipe or set of ingredients and their quantities that the manufacturer specifies for the
1067 final ink product. These ingredients are colorants (dyes and pigments) and components (volatile
1068 solvents, resins, etc.).
1069 (SWGDOC M01)
- 1070 **3.1.219**
1071 **ink jet process**
1072 A non-impact printing method in which the image is formed by projecting droplets of a liquid or
1073 solid printing medium onto a substrate.
- 1074 **3.1.220**
1075 **ink library**
1076 An organized collection of reference samples of inks and related materials.
1077 (SWGDOC M02)
- 1078 **3.1.221**
1079 **inked ribbon**
1080 A ribbon composed of a supporting substrate of film, fabric, or paper and a coating or impregnation
1081 of a coloring material. The coloring material is of such nature that it will transfer in part or entirely
1082 to a copy sheet at the point of pressure contact.
1083 (ASTM F221)

- 1084 **3.1.222**
1085 **insufficient**
1086 A determination made by an FDE that the material to be examined does not contain enough
1087 information for an examination to be conducted. This may be due to the amount, complexity,
1088 comparability, or line, reproduction or writing quality of the material. In many instances, FDEs
1089 report an inconclusive opinion, explaining limitations/insufficiency, rather than reporting an
1090 insufficient opinion.
1091 (NIST HF)
- 1092 **3.1.223**
1093 **intaglio printing**
1094 Process in which the image areas are below the non-image areas of the plate, resulting in raised
1095 printing on the substrate.
- 1096 **3.1.224**
1097 **inter-comparison**
1098 Comparison between two or more items to determine whether or not they share a common source.
- 1099 **3.1.225**
1100 **internal (intrinsic) factors**
1101 Conditions such as age, illness, disease, fatigue, emotional state, medication, intoxication by drugs
1102 or alcohol etc. that affect the handwriting movement and the resulting writing.
1103 (NIST HF)
- 1104 **3.1.226**
1105 **interpretation**
1106 Use of professional judgement to provide conclusions and/or opinions on hypothesis, based on
1107 findings and information gathered through the forensic process.
1108 (ISO 21043-1:2018)
- 1109 **3.1.227**
1110 **intra-comparison**
1111 Comparison within one or more items purportedly from one source, to determine whether it was
1112 prepared by a single source [see **common writership (authorship)**].
- 1113 **3.1.228**
1114 **irrelevant information**
1115 Not pertinent or applicable to the subject, material, or question being considered. The consideration
1116 may be broad (i.e., discipline level) or specific (i.e., task level).
1117 (NIST HF)
- 1118 **3.1.229**
1119 **item**
1120 [An] object, substance, or material that is collected, derived, or sampled as part of the forensic
1121 process.
1122 (ISO 21043-1:2018)


- 1123 **3.1.230**
1124 **knowledge, skills, and abilities**
1125 **KSA**
1126 The level of information, qualifications, and experience needed to perform assigned tasks.
1127 Knowledge refers to acquired principles and practices related to a particular job; skills refer to
1128 acquired psychomotor behaviors; and abilities are talents, observable behaviors, or acquired
1129 dexterity.
- 1130 **3.1.231**
1131 **known**
1132 Of established origin associated with the matter under investigation.
1133 (SWGDOC E01) (ASTM E1732)
- 1134 **3.1.232**
1135 **known writing**
1136 Of established origin used for comparison with questioned writing. Known writing may be collected
1137 or requested and can consist of exemplars or purported writing.
- 1138 **3.1.233**
1139 **landscape mode**
1140 A horizontal orientation of a document or image.
- 1141 **3.1.234**
1142 **laser printer**
1143 Nonimpact printer that uses a laser light source driven by digital signals to create images on a
1144 photoconductor (see [3.1.143 electrophotography](#)).
1145 (ASTM F909)
- 1146 **3.1.235**
1147 **leg**
1148 A large appendage typically on the right side of such characters as “R” and “K”, usually formed with a
1149 downward movement.
- 1150 **3.1.236**
1151 **letterpress**
1152 Relief printing using cast metal type, molded duplicate plates, or photo-polymer plates, which the
1153 imaged areas are raised above the non-printing areas, resulting in characters impressed into the
1154 substrate.
- 1155 **3.1.237**
1156 **lift**
1157 A product of an EDD examination. The developed image on the imaging film is preserved by
1158 applying fixing film to create a lift.
1159 (ANSI/ASB Std 044)
- 1160 **3.1.238**
1161 **liftoff**
1162 The removal of one or more images of copy from the substrate by transferring to an intermediate
1163 member.
1164 (ASTM F221)

- 1165 **3.1.239**
 1166 **liftoff correction**
 1167 The removal of a typed character by restriking with the same character while interposing an
 1168 adhesive coated tape or sheet, thereby causing the imprinted character to adhere to the coating and
 1169 be stripped from the record medium; then the intended character or space is placed therein.
- 1170 **3.1.240**
 1171 **ligature**
 1172 In printing or writing, two or three characters linked to create a single letterform such
 1173 that the terminal stroke of the first is the initial stroke of the second. 
- 1174 **3.1.241**
 1175 **limitation**
 1176 A constraint to the examination, comparison, or opinion formation process (e.g., non-original
 1177 documents, insufficient quantity or quality of material).
- 1178 **3.1.242**
 1179 **line continuity**
 1180 Uninterrupted writing. Discontinuity may be in the form of pen lifts, pen stops, hesitations, or
 1181 patching.
- 1182 **3.1.243**
 1183 **line quality**
 1184 The appearance of the written stroke caused by the basic movements and the manner of
 1185 manipulating the writing instrument. Results from the combination of such factors as speed,
 1186 rhythm, shading, and smoothness of movement. It may vary from good line quality that is smooth
 1187 and fluent to poor line quality that is tremulous and erratic.
- 1188 **3.1.244**
 1189 **line spacing**
 1190 The distance between successive lines of text, which for machine-generated documents is usually
 1191 measured from baseline to baseline.
- 1192 **3.1.245**
 1193 **Linear Sequential Unmasking**
 1194 **LSU**
 1195 A procedure that specifies the optimal order in which forensic experts examine submitted
 1196 documents in order to conduct a comparison and minimize the risk of bias.
- 1197 **3.1.246**
 1198 **liquid toner**
 1199 Material composed of carbon particles or colorants suspended in a liquid carrier.
 1200 (SWGDOC E05)
- 1201 **3.1.247**
 1202 **lithography**
 1203 The process of planographic printing in which the image to be printed is ink receptive/water
 1204 repellent, and the non-image area is ink repellent/water receptive.

- 1205 **3.1.248**
1206 **loop**
1207 A formation that curves and crosses itself.
1208 (SWGDOC T01)
- 1209 **3.1.249**
1210 **luminescence**
1211 The emission of radiant energy during a transition from an excited electronic state of an atom,
1212 molecule, or ion to a lower electronic state.
1213 (ASTM E131)
- 1214 **3.1.250**
1215 **manual typewriter**
1216 A typewriter whose operation depends solely upon the mechanical action powered by the operator.
1217 (SWGDOC E04)
- 1218 **3.1.251**
1219 **manuscript**
1220 (See [3.1.193 hand printing](#).)
1221 (SWGDOC T01)
- 1222 **3.1.252**
1223 **match between ink samples**
1224 The inability to distinguish between ink samples at a given level of analysis.
1225 (SWGDOC M01)
- 1226 **3.1.253**
1227 **match between samples**
1228 The inability to distinguish between two or more samples or items at a given level of analysis.
1229 (SWGDOC M01)
- 1230 **3.1.254**
1231 **medium**
1232 Substance(s) used to create an image or text.
- 1233 **3.1.255**
1234 **metadata**
1235 Information stored inside an electronic document or image that provides information which may
1236 include authorship, editing details, and the computer on which the document was created or
1237 modified.
- 1238 **3.1.256**
1239 **metamers**
1240 **(optical and instrumental examination, ink and paper)**
1241 Specimens differing in spectral reflectance but having colors that match in light of one spectral
1242 composition, when viewed by one observer, but may not match in light of other spectral
1243 compositions, or when viewed by another observer.
1244 (ASTM E284)

- 1245 **3.1.257**
1246 **model signature**
1247 A signature that is used as a prototype for a simulation or copy, by manual, electronic, or other
1248 means.
- 1249 **3.1.258**
1250 **natural variation**
1251 Those deviations among repetitions of the same handwriting characteristic(s) that are normally
1252 demonstrated in the habits of a writer.
- 1253 **3.1.259**
1254 **natural writing**
1255 Any specimen of writing executed without an attempt to control or alter its usual quality of
1256 execution.
1257 (SWGDOC E01)
- 1258 **3.1.260**
1259 **no conclusion**
1260 An opinion expressed due to insufficiency of material, significantly limiting factors, or the presence
1261 of both similarities and dissimilarities (it may also be expressed as Inconclusive, Indeterminate or
1262 Insufficient) (see [3.1.209 inconclusive opinion](#)).
- 1263 NOTE In handwriting, this can be the presence of disguise in the questioned and/or known writing or a lack
1264 of comparable writing.
- 1265 **3.1.261**
1266 **non-original**
1267 Reproduction of a document, e.g., photocopied, faxed, scanned, photographed.
1268 (NIST HF)
- 1269 **3.1.262**
1270 **non-ballpoint pen ink**
1271 Writing or marking media intended for use in a writing or marking instrument other than a
1272 ballpoint pen, including a dip or fountain pen, porous point pen, roller pen, marking instrument, etc.
1273 Typically, a thin, low viscosity ink with a water or solvent base (it may also be expressed as fluid pen
1274 ink).
- 1275 **3.1.263**
1276 **nonimpact printer**
1277 A printer in which image formation is not the result of mechanical impacts (e.g., thermal printer,
1278 electrostatic printer, electrophotographic printer, ink jet printer).
- 1279 **3.1.264**
1280 **observation**
1281 Recognizing and noting an occurrence.
- 1282 **3.1.265**
1283 **observational drawing**
1284 A visuomotor task in which visual information (an object, a photograph, handwriting) has to be
1285 translated into marks on the paper so that the copy ideally matches the original. Also known as
1286 sketching.

- 1287 **3.1.266**
 1288 **off-foot**
 1289 The lack of desired and optimum uniformity of contact between the typeface
 1290 and the substrate. Also known as “off its feet”.
 1291 (SWGDOC E04)
- 
- 1292 **3.1.267**
 1293 **offset**
 1294 Press design in which an image is transferred from a plate to a rubber blanket that moves the image
 1295 to the press sheet; offset principle allows plates to be right reading and generally gives a better-
 1296 quality image than do direct transfers.
- 1297 **3.1.268**
 1298 **offset lithography**
 1299 A rotary planographic process, which yields a flat printed image, producing both the image and non-
 1300 image areas of the plate chemically on one plane, creating the flat printing result. This process
 1301 utilizes viscous inks based on a mixture of oils and/or resins, containing pigments and additives.
- 1302 **3.1.269**
 1303 **offsite technical training**
 1304 Information, knowledge, or training gained by interaction with or demonstration by pertinent
 1305 manufacturers, businesses, and laboratories (e.g., paper mill, copier manufacturer) by going to a
 1306 particular location away from the usual training or work site.
- 1307 **3.1.270**
 1308 **opacity**
 1309 The property of paper that prevents the transmission of light.
 1310 (SWGDOC M03)
- 1311 **3.1.271**
 1312 **open top**
 1313 A letter formation such as the handwritten “a” or “o” in which the top has not been closed.
- 1314 **3.1.272**
 1315 **opinion**
 1316 Conclusion, judgment– a coherent, scientifically sound expression(s) that takes into consideration
 1317 task-relevant information in addition to observations, data, calculations and interpretations.
- 1318 **3.1.273**
 1319 **original typed text**
 1320 Typed text imprinted onto the surface of a record medium as the result of the impact of a typeface
 1321 striking directly or through a ribbon.
 1322 (SWGDOC E11)
- 1323 **3.1.274**
 1324 **originating document**
 1325 The document or other substrate with the handwriting, machine, or other markings that caused
 1326 indentation(s) on a document(s) or other substrate beneath it (the recipient document).
 1327 (ANSI/ASB Std 044)

- 1328 **3.1.275**
 1329 **overprint correction**
 1330 The removal of a typed character from the text by restriking with the same character while
 1331 interposing a tape or sheet coated with an opaque coating material, thereby causing the imprinted
 1332 character to be covered by the coating.
 1333 (SWGDOC E11)
- 1334 **3.1.276**
 1335 **overspray**
 1336 Type of extraneous or undesirable ink dot(s) near the printed zones which originate from the
 1337 printhead.
- 1338 **3.1.277**
 1339 **paper fiber impression**
 1340 The imprint of a paper fiber in the ribbon substrate.
 1341 (SWGDOC E11)
- 1342 **3.1.278**
 1343 **paraph**
 1344 A writing movement sweeping over or under a signature in a stylistic
 1345 manner, and is considered to be a part of the signature. 
- 1346 **3.1.279**
 1347 **parylene processing**
 1348 The deposition of a clear polymer coating on a document(s) within a vacuum chamber to
 1349 strengthen and stabilize the document(s).
 1350 ([ANSI/ASB Std 127-Draft](#))
- 1351 **3.1.280**
 1352 **patching**
 1353 Returning to a portion of the writing for the retouching of a stroke, letter, or character.
- 1354 **3.1.281**
 1355 **payee perforator**
 1356 An optional device on a check writer that perforates or shreds a pattern above the numeric
 1357 impression region for the purpose of protecting the payee entry from alteration.
 1358 (SWGDOC E07)
- 1359 **3.1.282**
 1360 **pen emphasis**
 1361 The act of forcing the pen against the paper surface with increased pressure. When the pen point
 1362 has flexibility, this emphasis produces shading; but with more rigid writing points such as ball point
 1363 pens, heavy pen emphasis can occur without any evidence of shading.
- 1364 **3.1.283**
 1365 **pen direction**
 1366 The direction the pen moves to produce a character, connection, or signature.
 1367 (NIST HF)

- 1368 **3.1.284**
1369 **pen lift**
1370 An interruption in a stroke caused by removing the writing instrument from the writing surface.
- 1371 **3.1.285**
1372 **pen nib**
1373 The writing portion of a dip pen or fountain pen.
- 1374 **3.1.286**
1375 **pen position**
1376 The relationship of the writing instrument to the writing surface.
- 1377 **3.1.287**
1378 **pen pressure**
1379 The force with which the writing instrument contacts the paper.
1380 (SWGDOC T01)
- 1381 **3.1.288**
1382 **perforation**
1383 A small hole or a group of small holes punched in a sheet of paper.
- 1384 **3.1.289**
1385 **phosphorescence**
1386 Any delayed emission of optical radiation which appears 10 ns or longer after the excitation.
1387 (CIE S 017/E:2011 ILV)
- 1388 **3.1.290**
1389 **photoluminescence**
1390 Luminescence produced by the absorption of radiant flux; distinguished from ordinary reflection by
1391 a time delay and, usually, a shift toward longer wavelengths (see fluorescence and
1392 phosphorescence).
1393 (CIE S 017/E:2011 ILV)
- 1394 **3.1.291**
1395 **piezoelectric**
1396 Ink jet technology where the electrically stimulated deformation of a crystal causes the expulsion of
1397 the droplets from the ink chamber.
1398 (SWGDOC E06)
- 1399 **3.1.292**
1400 **pitting**
1401 Small defects in the surface of the photoreceptor that produce spots or voids on the printout.
1402 (ASTM F1457)
- 1403 **3.1.293**
1404 **pixel**
1405 Small single-colored square display elements that comprise a bitmap.

- 1406 **3.1.294**
1407 **pixelation**
1408 A grainy or blurry effect caused by displaying a bitmap or a section of a bitmap at such a large size
1409 that individual pixels are visible.
- 1410 **3.1.295**
1411 **pixels per inch**
1412 **PPI**
1413 The measure of resolution in a digital image or video display.
- 1414 **3.1.296**
1415 **planchettes**
1416 Small discs randomly distributed within the fibers or on the surface of security paper during the
1417 paper manufacturing process.
- 1418 **3.1.297**
1419 **planographic printing**
1420 A method in which the image and non-image areas of the printing plate are on the same plane.
- 1421 **3.1.298**
1422 **platen**
1423 A flat or rounded surface with a variety of functions in printing or manufacturing. It can be a flat
1424 metal (or earlier, wooden) plate pressed against a medium (such as paper) to cause an impression
1425 in letterpress printing. May also refer to a typewriter roller, the glass surface of a copier, or an EDD
1426 vacuum bed.
- 1427 **3.1.299**
1428 **polyester film encapsulation**
1429 A process whereby a document(s) or fragments of a document are sealed between two sheets of
1430 polyester film to preserve, stabilize, and facilitate handling.
- 1431 **3.1.300**
1432 **portrait mode**
1433 A vertical orientation of a document or image.
- 1434 **3.1.301**
1435 **prefix**
1436 The portion of the check writer impression located immediately to the left of the numeric value.
1437 (SWGDOC E07)
- 1438 **3.1.302**
1439 **primary image**
1440 The first instance in which an image is recorded onto any media that is a separate, identifiable
1441 object (for example, a digital image recorded on flash media).
1442 (SWGDOC D01)

- 1443 **3.1.303**
1444 **primary indentation**
1445 An impression on a document(s) or other substrate(s) beneath the originating document caused by
1446 the act of writing or other dynamic actions.
1447 (ANSI/ASB Std 044)
- 1448 **3.1.304**
1449 **principal trainer**
1450 Person with the primary responsibility for the training program administered to an individual.
- 1451 **3.1.305**
1452 **printer**
1453 Output device that produces a hardcopy record of data in the form of a sequence of discrete
1454 graphics belonging to a predetermined character or image set.
- 1455 **3.1.306**
1456 **printer output area**
1457 Maximum area on the page to which the printer will print.
1458 (ASTM F1457)
- 1459 **3.1.307**
1460 **printhead**
1461 Printing device of an ink jet or thermal printing system.
- 1462 **3.1.308**
1463 **printing element**
1464 The parts of the total checkwriter impression that are not parts of the prefix which may encompass
1465 the currency type, decimal points, and commas.
1466 (SWGDOC E07)
- 1467 **3.1.309**
1468 **printing medium**
1469 A substance used to create an image, such as printing ink, toner, or wax.
- 1470 **3.1.310**
1471 **printing module**
1472 Those components in the laser printer that together drive the laser scanner, create the image on the
1473 page, and deliver the page to the stacker.
- 1474 **3.1.311**
1475 **processed image**
1476 Any image that has undergone enhancement, restoration, or other operation.
1477 (SWGDOC D01)
- 1478 **3.1.312**
1479 **proportions**
1480 Relative size of characters, elements of characters, or of words.

- 1481 **3.1.313**
1482 **proportional spacing**
1483 A system of printing where the character spacing is set in accordance with the character width (see
1484 [3.1.165 fixed pitch](#)).
1485 (SWGDOC E04)
- 1486 **3.1.314**
1487 **proposition (forensic)**
1488 A statement or assertion about the origin or nature of the materials under examination, which is
1489 either true or false.
- 1490 **3.1.315**
1491 **purported writing**
1492 Known writing not witnessed by the forensic document examiner.
- 1493 **3.1.316**
1494 **qualified sources**
1495 Organizations or individuals that provide, sponsor, or otherwise arrange for creditable training or
1496 instruction on forensic document examination specific topics. These sources support, either
1497 through reflection in their policies or by the individual presenting the training, the type of training
1498 and required minimum criteria provided in American National Standards.
- 1499 **3.1.317**
1500 **questioned**
1501 Associated with the matter under investigation about which there is some dispute or query,
1502 including, but not limited to, whether two or more items have a common source.
- 1503 **3.1.318**
1504 **questioned writing**
1505 **also Q**
1506 Handwriting about which the authenticity or writership is in doubt.
1507 (NIST HF)
- 1508 **3.1.319**
1509 **rainbow printing**
1510 A printing technique that combines different color inks to produce a subtle transition between
1511 colors.
- 1512 **3.1.320**
1513 **random error**
1514 A component of error whereby replicate measurements vary in an unpredictable way. Sources of
1515 random error are usually unexplained and therefore difficult to control.
1516 (NIST HF)

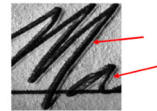
- 1517 **3.1.321**
1518 **randomly acquired characteristic**
1519 **RAC**
1520 A feature or defect that can occur in the manufacturing process or from individual usage occurring
1521 after manufacture (for example, wear and damage defects such as cuts and gouges, reproducible
1522 blemishes, impression voids, improper and extraneous inking, or coincidental peripheral printing).
1523 The position, orientation, size and shape of these characteristics are features that are part of the
1524 information a FDE uses to form an opinion about the probability of items being generated by the
1525 same or different source.
- 1526 **3.1.322**
1527 **range of variation**
1528 The accumulation of deviations among repetitions of respective handwriting characteristics that are
1529 typically demonstrated in the writing habits of an individual (see [3.1.421 variation](#)).
- 1530 **3.1.323**
1531 **raster output scanner**
1532 Output peripheral, either stand alone or within a printer, that converts computer data into a
1533 bitmapped image, which is sent to the host for storage or a printer for output.
- 1534 **3.1.324**
1535 **rebound**
1536 A double impression of a typed character, the second lighter than and overlapping the first.
1537 (SWGDOC E04)
- 1538 **3.1.325**
1539 **recipient document**
1540 The document or other substrate that received indentations, other paper fiber disturbances, or
1541 other markings.
1542 (ANSI/ASB Std 044)
- 1543 **3.1.326**
1544 **record medium**
1545 A piece of material, usually paper, on which an image or information is recorded.
- 1546 **3.1.327**
1547 **reference collection**
1548 An assemblage of established materials, substances, objects or artefacts of known properties or
1549 origin that may be used in the determination of the properties or origins of unknown items.
- 1550 **3.1.328**
1551 **relevant information**
1552 Pertinent and applicable to the subject, material, or question being considered; the consideration
1553 may be broad (i.e., discipline level) or specific (i.e., task level).
- 1554 **3.1.329**
1555 **reliability**
1556 Consistency of results as demonstrated by reproducibility or repeatability.

- 1557 **3.1.330**
 1558 **relief printing**
 1559 A method in which the image areas are above the non-image areas of the printing
 1560 plate. 
- 1561 **3.1.331**
 1562 **repeatability**
 1563 A measure of reliability using the same FDE and the same instrument/method under exactly the
 1564 same conditions to arrive at the same conclusion or result.
 1565 (NIST HF)
- 1566 **3.1.332**
 1567 **reproducibility**
 1568 A measure of reliability using different FDEs and/or differing conditions with the same
 1569 measurement instrument/method to arrive at the same conclusion or result.
 1570 (NIST HF)
- 1571 **3.1.333**
 1572 **reproduction quality**
 1573 Extent to which a non-original document accurately replicates the features of the original
 1574 document.
- 1575 **3.1.334**
 1576 **requested writing**
 1577 Handwriting samples prepared by a particular person specifically for the purpose of comparison,
 1578 usually to questioned material.
- 1579 **3.1.335**
 1580 **result**
 1581 The product of the forensic service provider. This term is broad and may include observations, data,
 1582 calculations, interpretations, findings, and opinions.
- 1583 **3.1.336**
 1584 **retouching**
 1585 Adding handwritten lines or strokes in order to correct, improve, distort, or alter.
- 1586 **3.1.337**
 1587 **retrace**
 1588 A stroke written over the preceding stroke, typically in reverse direction. 
- 1589 **3.1.338**
 1590 **review, administrative**
 1591 An assessment of the non-technical content associated with an examination and report.
- 1592 NOTE This commonly includes, but may not be limited to, the verification of the presence of all documents
 1593 listed in the request for examination and the report, the verification of the appropriate marking of all
 1594 documents, the documentation of chain of custody, case notes, and typographical or other clerical errors.

- 1595 **3.1.339**
1596 **review, technical**
1597 An assessment by another qualified forensic document examiner to review the method(s) and
1598 result(s) of the examiner of record to ensure the conclusion(s) rendered are supported.
- 1599 NOTE A technical review commonly includes, but may not be limited to, the adequacy of technical notes, the
1600 verification of method(s) used, the determination of the adequacy or limitations of the evidence, the proper
1601 use of equipment, whether all pertinent examinations were performed, whether the findings are consistent
1602 with the observations noted/recorded during the examination, the applicable nature of any references, and
1603 documentation of the performance of the review.
- 1604 **3.1.340**
1605 **ribbon shift**
1606 The movement of a multicolored inking ribbon allowing for a change in color to manifest itself in an
1607 impressed character.
1608 (SWGDOC E07)
- 1609 **3.1.341**
1610 **roller device**
1611 Wheel-type components designed to grab and transport paper into and through printers and
1612 copiers.
- 1613 **3.1.342**
1614 **roller marks**
1615 Visible or latent indented features in paper resulting from transport rollers in a printing or copying
1616 system.
- 1617 **3.1.343**
1618 **rollerball pen**
1619 A writing instrument that uses a tiny, revolving ball to dispense liquid ink onto paper. Gel and
1620 ballpoint pens use the same ball mechanism to deposit their ink but use gel- and oil-based ink,
1621 respectively.
- 1622 **3.1.344**
1623 **rubber stamp**
1624 (See [3.1.376 stamping device](#).)
- 1625 **3.1.345**
1626 **sample**
1627 Subset of a group (i.e., the totality of items under consideration) made up of one or more items (i.e.,
1628 the individual parts into which that group is divided).
- 1629 NOTE A group may be real and finite, real and infinite, or completely hypothetical.
- 1630 **3.1.346**
1631 **satellites**
1632 Extraneous or undesirable toner particles or ink droplets (see spatter, spray).




- 1633 **3.1.347**
 1634 **screen printing**
 1635 A method in which the image areas are on fine mesh screen through which ink can penetrate and
 1636 the non-image areas are a stencil over the screen.
- 1637 **3.1.348**
 1638 **secondary indentation**
 1639 **secondary impression**
 1640 Fiber disturbance(s) not caused by the act of writing or other dynamic actions, rather caused by
 1641 dynamic contact with the embossed side of an indentation(s) or other raised surface.
 1642 (ANSI/ASB Std 044)
- 1643 **3.1.349**
 1644 **set off**
 1645 The unintentional transfer of part of an image or ink from its intended location to another surface.
 1646 (ASTM F221)
- 1647 **3.1.350**
 1648 **shading**
 1649 Variations in the line width or density resulting from changes in the pressure of the writing
 1650 instrument on the document; also associated with variations in pressure when using a split nib pen.
 1651 Also referred to as stress.
- 1652 **3.1.351**
 1653 **side lighting**
 1654 Illumination from a light source at a low angle of incidence, or even parallel, to the surface of the
 1655 item. *Syn. oblique lighting, grazing illumination, raking lighting.*
 1656 (ANSI/ASB Std 044)
- 1657 **3.1.352**
 1658 **signature style**
 1659 1) Text-based (all allographs legible),
 1660 2) Mixed style (two or more allographs are legible),
 1661 3) Stylized (one or no allographs are legible).
 1662 (NIST HF)
- 1663 **3.1.353**
 1664 **significant difference**
 1665 A feature that is structurally divergent between items or groups of items, is outside the observed
 1666 range of variation of at least one of them, and that cannot be reasonably explained.
- 1667 **3.1.354**
 1668 **significant similarity**
 1669 A repeated distinguishing characteristic that is structurally similar between items or groups of
 1670 items and is within their observed range of variation (e.g., consistent height ratio, consistent pen
 1671 lift).

- 1672 **3.1.355**
 1673 **similarity**
 1674 A feature or characteristic observed in one item or group of items that is also observed in the same
 1675 form in a comparable item or group of items.
- 1676 **3.1.356**
 1677 **simplistic writing**
 1678 Characterized by non-complex characters or strokes.
 1679 (NIST HF)
- 1680 **3.1.357**
 1681 **simulation**
 1682 An attempt to copy or reproduce handwriting (e.g., tracing, free hand, non-spurious).
- 1683 **3.1.358**
 1684 **single element typewriter**
 1685 A typewriter that generates text via interchangeable “elements” that each contain a full set of
 1686 characters.
 1687 (SWGDOC E04)
- 1688 **3.1.359**
 1689 **single strike film ribbon**
 1690 An inked ribbon wherein the substrate is a plastic film material such as polyethylene, where each
 1691 area of the ribbon is capable of producing only one image.
 1692 (ASTM F221)
- 1693 **3.1.360**
 1694 **single strike paper ribbon**
 1695 An inked ribbon wherein the substrate is paper, where each area of the ribbon is capable of
 1696 producing only one image.
 1697 (ASTM F221)
- 1698 **3.1.361**
 1699 **sister lines**
 1700 Sporadic inkless or partially inkless indented lines in a writing surface that are
 1701 produced by the annular rim of a ball pen during the process of writing or making
 1702 other markings, and which precisely run parallel to the primary ink line laid down
 1703 by the ball pen.
- 1704 **3.1.362**
 1705 **skill**
 1706 How well an individual is able to produce and repeat the formation of handwritten characters.
 1707 (NIST HF)
- 1708 **3.1.363**
 1709 **slant**
 1710 **slope**
 1711 The angle or inclination of the axis of letters relative to the baseline.
 1712 (NIST HF)





- 1713 **3.1.364**
 1714 **slit glass**
 1715 Alternate scanning surface found in some digital photocopiers used in conjunction with an
 1716 automatic document feeder.
 1717 (SWGDOC E06)
- 1718 **3.1.365**
 1719 **smudge**
 1720 A handwritten or machine printed character smeared or streaked, unintentionally, onto an adjacent
 1721 area.
- 1722 **3.1.366**
 1723 **source (of optical radiation)**
 1724 Object that produces light or other radiant flux.
 1725 (CIE S 017/E:2011 ILV)
- 1726 **3.1.367**
 1727 **spacing**
 1728 The distance between characters, words, or lines.
- 1729 **3.1.368**
 1730 **spatter**
 1731 Type of extraneous or undesirable ink droplet originating when a portion of an ink droplet strikes
 1732 the intended area and is deflected to an unintended area.
 1733 (ASTM F1857)
- 1734 **3.1.369**
 1735 **spectroscopy**
 1736 The study of the absorption or emission of electromagnetic energy by a chemical species as a
 1737 function of the energy incident upon that species; this analytical technique is used to identify
 1738 elements and/or atomic and molecular structure by measurement of the radiant energy absorbed
 1739 or emitted by a substance in any of the wavelengths of the electromagnetic spectrum.
- 1740 **3.1.370**
 1741 **specular reflection**
 1742 **regular reflection**
 1743 A mirror-like reflection of waves, such as light, that is reflected at a definite angle from a surface.
- 1744 **3.1.371**
 1745 **speed of execution**
 1746 The swiftness with which a body of writing or signature is prepared. With the exception of some
 1747 digitally captured writing, it cannot be measured precisely, but can be interpreted in broad terms
 1748 such as slow, moderate, or rapid.
- 1749 **3.1.372**
 1750 **spur**
 1751 A small, angled appendage at the beginning or end of a stroke revealing an abrupt
 1752 change of direction of the writing instrument. Also called hook or tick.



- 1753 **3.1.373**
 1754 **squeegee effect**
 1755 The heavier concentration of ink on the edge of the ink line due to the ink being
 1756 squeezed outward by the pressure used in the relief printing process.
- 
- 1757 **3.1.374**
 1758 **staff**
 1759 The vertical strokes of letters, such as “B”, “T”, and “P”, that have a main stroke
 1760 connecting to the baseline.
- 
- 1761 **3.1.375**
 1762 **standard**
 1763 (See [3.1.74 collected writing](#), [3.1.327 reference collection](#).)
- 1764 **3.1.376**
 1765 **stamping device**
 1766 A hand-marking device capable of making an inked impression using a variety of die materials that
 1767 include, but are not limited to, vulcanized rubber, laserable rubber, photopolymer, gel, and metal.
 1768 Synonyms: hand stamp, self-inking stamp, pre-inked stamp, flat-die, cachet.
 1769 (ANSI/ASB Std 117)
- 1770 **3.1.377**
 1771 **stem – primary and secondary**
 1772 In typography, vertical or full-length angled strokes. Where there is a difference in the
 1773 stroke thicknesses in printed characters with more than one stroke connecting to the
 1774 baseline, the primary stem is thicker, and the secondary stem is thinner.
- 
- 1775 **3.1.378**
 1776 **stochastic screening**
 1777 An alternative to traditional halftone dots, this random-placement dot strategy uses frequency
 1778 modulation (FM) to render enlarged images on large format printing devices. Unlike halftone, the
 1779 dots are of a uniform size with darker areas having more dots packed closer together.
- 1780 **3.1.379**
 1781 **stroke**
 1782 A single written line, either ascending, descending, or lateral in the formation of a letter or any of its
 1783 parts.
 1784 (H&H Glossary)
- 1785 **3.1.380**
 1786 **structural features**
 1787 Characteristics relating to the construction of handwriting (e.g., number, position, order, and
 1788 direction of strokes) (see [3.1.136 ductus](#)).
- 1789 **3.1.381**
 1790 **style (design)**
 1791 The general category of allograph (letter form) that is employed to execute writing, e.g., cursive or
 1792 hand printing.
 1793 (NIST HF)

- 1794 **3.1.382**
1795 **submersion**
1796 The process of placing a document(s) into a liquid that is appropriate to facilitate cleaning,
1797 unfolding, or separating the document(s).
- 1798 **3.1.383**
1799 **substrate**
1800 A material or surface that is written on, usually paper.
- 1801 **3.1.384**
1802 **sufficient quantity (general)**
1803 The amount of material required to assess the distinguishing features of the questioned item(s) or
1804 known item(s) based on the expert's professional judgement.
- 1805 **3.1.385**
1806 **sufficient quantity (handwriting)**
1807 The amount of writing required to assess the writer's distinguishing features and range of variation
1808 based on the expert's professional judgement.
- 1809 **3.1.386**
1810 **suitability**
1811 Sufficient quantity, quality, and complexity for comparison purposes.
- 1812 **3.1.387**
1813 **systematic error**
1814 A component of error whereby replicate measurements remain constant or vary in a predictable
1815 way - for example an uncalibrated instrument would produce a constant systematic error.
1816 (NIST HF)
- 1817 **3.1.388**
1818 **task-irrelevant information**
1819 Information that is not pertinent or applicable to the subject, material, or question being
1820 considered. The consideration may be broad (i.e., case or discipline level) or specific (i.e., task level)
1821 (see [3.1.32 bias](#), [3.1.33 bias cognitive](#), [3.1.34 bias confirmation](#), [3.1.35 bias contextual](#)).
- 1822 **3.1.389**
1823 **task-relevant information**
1824 Information that is pertinent and applicable to the subject, material, or question being considered.
1825 The consideration may be broad (i.e., case or discipline level) or specific (i.e., task level) (see [3.1.32](#)
1826 [bias](#), [3.1.33 bias cognitive](#), [3.1.34 bias confirmation](#), [3.1.35 bias contextual](#)).
- 1827 **3.1.390**
1828 **technical visit**
1829 Travel for the purpose of obtaining information, knowledge, or training, including interaction with
1830 or demonstration by pertinent manufacturers, businesses, and laboratories.
1831 (SWGDOC G02)
- 1832 **3.1.391**
1833 **terminal stroke**
1834 The final stroke of a character or word.

- 1835 **3.1.392**
1836 **thermal imaging transfer ribbon**
1837 Plastic film or other material, upon which a dye or pigmented coating is applied; imaging results
1838 when a thermal printhead transfers the coating onto a suitable substrate or receptor media.
1839 (ASTM F1623)
- 1840 **3.1.393**
1841 **thermal impulse**
1842 Ink jet technology where the rapid expansion of a bubble in the ink created by localized electrical
1843 heating expels the droplets from the ink chamber.
1844 (SWGDOC E06)
- 1845 **3.1.394**
1846 **thermal paper printing**
1847 A non-impact method in which the image is formed by the action of heat on a treated substrate.
- 1848 **3.1.395**
1849 **thermal print head**
1850 Mechanism for printing with a temperature-sensitive substance; heat transfer is affected by
1851 touching heated pin tips to the material to cause a reaction.
- 1852 **3.1.396**
1853 **thermal ribbon**
1854 Plastic film or other material, upon which a dye or pigmented coating is applied; imaging results
1855 when a thermal printhead transfers the coating onto a suitable substrate or receptor media.
- 1856 **3.1.397**
1857 **thermal transfer printing**
1858 A non-impact method in which the image is created by the action of a heated print head through a
1859 medium coated ribbon. This includes wax transfer, dye sublimation, and thermal fusion methods.
- 1860 **3.1.398**
1861 **thermography**
1862 A two-stage printing method in which a resinous powder adheres to wet ink. After heating, the
1863 compound rises to resemble raised or engraved printing.
- 1864 **3.1.399**
1865 **thimble element**
1866 An element used in an impact printing device in which the fully formed characters are located on
1867 the ends of finger-like devices that are similar to a daisy wheel except that the device is formed to
1868 produce a cup-like or thimble structure.
1869 (SWGDOC E04-13)
- 1870 **3.1.400**
1871 **thread count (in typewriter/printer ribbons)**
1872 The total number of horizontal and vertical threads per in.² of fabric.

- 1873 **3.1.401**
 1874 **tooth**
 1875 Quality of paper, or other writing surface that causes drag or resistance to the pen. A smooth, slick
 1876 surface with no tooth can result in thick hairlines and lack of control in writing. Medium tooth
 1877 causes just enough drag on the pen to facilitate control, produce fine hairlines and allow the writing
 1878 process to be rhythmical. Too much tooth impedes ink flow and progress of the pen.
- 1879 **3.1.402**
 1880 **tracing**
 1881 Handwriting prepared by drawing the image of a genuine writing on a target document, which may
 1882 be produced with the aid of carbon paper, transmitted light, or indented lines.
- 1883 **3.1.403**
 1884 **training**
 1885 The formal, structured process through which a person progresses from their current level of
 1886 knowledge and expertise to the level of competency required to conduct specific tasks in
 1887 accordance with American National Standards.
- 1888 **3.1.404**
 1889 **tram lines**
 1890 An accumulation of ink found on both sides of an ink line, typically caused by
 1891 squeegee effect from a gel ink pen. 
- 1892 **3.1.405**
 1893 **transmitted lighting**
 1894 Illumination that passes through a document.
 1895 (ANSI/ASB Std 035)
- 1896 **3.1.406**
 1897 **tremor**
 1898 Shaky, irregular handwriting movements that are slowly executed or written by a person suffering
 1899 from advanced age, nervousness, drug/alcohol influence, or physical/mental infirmities. These
 1900 features can also be characteristic of unnaturally slow pen movements due to conscious attention to
 1901 letterforms in deliberate drawings, rather than spontaneous writings.
- 1902 **3.1.407**
 1903 **trough**
 1904 The lighter or non-inked furrow between the tram lines typically seen in
 1905 gel pen writing. 
- 1906 **3.1.408**
 1907 **type of writing**
 1908 Refers to hand printing, cursive writing, numerals, symbols, or combinations thereof, and
 1909 signatures.
 1910 (SWGDOC E01)
- 1911 **3.1.409**
 1912 **type slug**
 1913 The block (usually metal) attached to the end of the typebar that bears the typeface.
 1914 (SWGDOC E04)

- 1915 **3.1.410**
1916 **typebar**
1917 A bar, mounted on a typewriter, that holds a type slug(s).
1918 (SWGDOC E04)
- 1919 **3.1.411**
1920 **typeface**
1921 The portion of the element or type slug that projects from the body and contacts the surface of the
1922 substrate to form the character.
1923 (SWGDOC E04)
- 1924 **3.1.412**
1925 **typeface defect**
1926 Deviation from the intended appearance of a character due to physical damage to the typeface or its
1927 malformation in manufacture.
1928 (SWGDOC E04)
- 1929 **3.1.413**
1930 **typestyle**
1931 A particular variant of a type design.
1932 (SWGDOC E04)
- 1933 **3.1.414**
1934 **typestyle classification scheme**
1935 Hierarchical taxonomic schematic, key, or computer database that can be used to determine the
1936 source of a particular typestyle.
1937 (SWGDOC E04)
- 1938 NOTE These schemes are only an aid for searching a typestyle library and are not a substitute for actual
1939 reference materials in the typestyle library.
- 1940 **3.1.415**
1941 **typestyle library**
1942 An organized collection of reference samples of typestyles and related materials.
1943 (SWGDOC E04)
- 1944 NOTE Reference materials can also include information such as typestyle catalogs, treatises relative to
1945 typography and the design of typestyles used on typewriters and other printing systems, typewriters, type
1946 slugs, type elements, actual strike-ups, and instruction and repair manuals.
- 1947 **3.1.416**
1948 **typewriter**
1949 A self-contained machine for character-by-character direct writing by means of keyboard operated
1950 typefaces.
1951 (SWGDOC E04)

- 1952 **3.1.417**
 1953 **typewriter grid**
 1954 **schneeberger grid**
 1955 A network of uniformly spaced horizontal and perpendicular lines, generally on a glass or acetate
 1956 surface, used to check the alignment characteristics of typewriting or printing. The grids come in
 1957 varying sizes and are physically placed on top of the document for measuring. Computer
 1958 technology allows for these to be created in any spacing desired and overlaid on an image that has
 1959 been imported into the computer.
- 1960 **3.1.418**
 1961 **ultraviolet**
 1962 **UV**
 1963 **ultraviolet radiation**
 1964 **UVR**
 1965 Radiation for which the wavelengths are shorter than those for visible radiation.
- 1966 NOTE 1 The range between 100 nm and 400 nm is commonly subdivided into:
 1967 UV-A: 315 nm to 400 nm;
 1968 UV-B: 280 nm to 315 nm;
 1969 UV-C: 100 nm to 280 nm.
- 1970 NOTE 2 A precise border between “ultraviolet” and “visible” cannot be defined, because visual sensation at
 1971 wavelengths shorter than 400 nm is noted for very bright sources.
 1972 (CIE S 017/E:2011 ILV)
- 1973 **3.1.419**
 1974 **unaccustomed hand**
 1975 The opposite hand (or other body part) from that normally used for writing.
 1976 (SWGDOC T01)
- 1977 **3.1.420**
 1978 **unnatural writing**
 1979 A writing movement not typical in day-to-day writing that may be the result of intent, or internal/
 1980 external factors.
 1981
 1982 NOTE Some characteristics of unnatural writing movements include slow speed, poor line quality, poor line
 1983 continuity with stops or hesitations in the pen line, and blunt commencement and termination strokes. This is
 1984 often seen in disguised or simulated writing.
- 1985 **3.1.421**
 1986 **variation (handwriting)**
 1987 One or more forms (constructions) of a character or word in a naturally produced sample of
 1988 handwriting. These deviations among repetitions of the same handwriting characteristic(s) are
 1989 normally demonstrated in the habits of each writer.
- 1990 **3.1.422**
 1991 **variation (typewriters and printers)**
 1992 Imprecise duplication in multiple impressions from the same machine. The cause of this may be
 1993 manifested due to wear and tear in a machine part(s).

1994	3.1.423
1995	verification
1996	The subsequent independent examination by another trained and competent examiner to either
1997	support or refute the conclusions of the original examiner. Verification for some laboratories may
1998	require that original items need to be examined.
1999	3.1.424
2000	visible radiation
2001	Any optical radiation capable of causing a visual sensation directly.
2002	NOTE There are no precise limits for the spectral range of visible radiation since they depend upon the
2003	amount of radiant power reaching the retina and the responsivity of the observer. The lower limit is generally
2004	taken between 360 nm and 400 nm and the upper limit between 760 nm and 830 nm.
2005	(CIE S 017/E:2011 ILV)
2006	3.1.425
2007	watermark
2008	A translucent design, pattern, or symbol created in paper by varying the opacity or distribution of
2009	fibers within an area of the paper to identify the manufacturer, brand, or customer. It is best seen
2010	when held up to light.
2011	3.1.426
2012	writer
2013	The individual who applies handwritten markings with a writing instrument on a substrate.
2014	3.1.427
2015	writing instrument
2016	Any tool used to create handwritten markings on a substrate. Typically used to describe the use of a
2017	pen, pencil, crayon, or other marker.
2018	3.1.428
2019	writing movement
2020	A pattern of the action of a writing instrument. These movements may be described as garland,
2021	arcade, angular, or indeterminable.
2022	3.1.429
2023	writing surface
2024	The underlying plane on which the substrate, or the writing itself, is placed.
2025	

Annex A (informative)

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