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**Standard for the Preservation and Examination of  
Liquid Soaked Documents**



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## Standard for the Preservation and Examination of Liquid Soaked Documents

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## Foreword

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](mailto:asb@aafs.org) or 401 N 21st Street, Colorado Springs, CO 80904.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

ASB procedures are publicly available, free of cost, at [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board).

**Keywords:** *forensic sciences, freeze dry, liquid soaked documents, preservation, questioned documents, water soaked documents*

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# Standard for the Preservation and Examination of Liquid Soaked Documents

## 1 Scope

This document establishes the minimum required procedures used by Forensic Document Examiners (FDEs) in the preservation of, examination of, and reporting on liquid soaked documents. This generally includes the examination of documents exposed to liquids (water, blood, oils etc.) for content (writing, printing), material (paper, cardboard, plastic etc.), and source determination. This standard does not include the examination of documents for the identification of the liquid contaminate(s).

## 2 Normative References

The following reference is indispensable for the application of the standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

*SWGDOC Standard for Scope of Work of Forensic Document Examiners, 2013*

## 3 Terms and Definitions

For purposes of this document, the following definitions apply.

### 3.1

#### **bone folder**

A piece of shaped bone or other material, such as plastic or non-stick material, typically used by bookbinders to crease paper and to separate pieces of paper that are stuck together.

### 3.2

#### **digital image processing**

Any activity that develops/enhances a digital image.

### 3.3

#### **liquid soaked document(s)**

Document(s) exposed to or immersed in liquid(s).

### 3.4

#### **polyester film encapsulation**

A process whereby a document is sealed between two sheets of polyester film to preserve, stabilize, and facilitate handling.

### 3.5

#### **submersion**

The placement of a document(s) into a liquid to facilitate cleaning, unfolding, or separation of the document(s).

## **4 Requirements**

### **4.1 Competence**

#### **4.1.1 General**

Competency in the examination of liquid soaked documents, as it relates to this document, is based upon a combination of the requisite knowledge, skills, and abilities acquired through appropriate education, training, and experience specific to forensic document examination.

#### **4.1.2 Requisite Knowledge, Skills, and Abilities**

It is critical to have a knowledge base that includes: the materials used in the production of documents; the response of those substrates to humidity and liquids; the processes used to preserve and restore documents, as well as the skills and abilities to analyze, compare, and evaluate case-related items.

### **4.2 Equipment**

**4.2.1** The necessary time and facilities shall be made available to complete all applicable procedures and to maintain the condition of the items under examination. The FDE shall conform to the requirements in *SWGDOC Standard for Scope of Work of Forensic Document Examiners, 2013*.

**4.2.2** Appropriate light source(s) to distinguish fine detail shall be available. Natural, incandescent, fluorescent, light emitting diode (LED), or fiber optic lighting sources are generally used. These may include transmitted, side, and vertical incident lighting.

**4.2.3** Optical or digital magnification necessary to resolve fine detail shall be available. The magnification level and the equipment used to observe the feature(s) should be recorded.

**4.2.4** Image capture device(s) capable of sufficient resolution to record accurate detail shall be available. The equipment used and the resolution needed to observe the feature(s) should be recorded.

**4.2.5** Infrared (IR) image conversion device or system with appropriate light sources and filters for use in infrared reflectance (IRR) and infrared luminescence (IRL) examinations shall be available.

**4.2.6** Ultraviolet (UV) sources shall be available.

**4.2.7** Measuring devices shall be available, these may include paper micrometer, typewriter grids, rulers, and magnifiers with reticle patterns.

**4.2.8** Polyester film or other encapsulation material, as required.

**4.2.9** Other equipment or devices generally used in the forensic document examination discipline that should be available for the preservation and examination of liquid soaked documents, as deemed appropriate by the FDE, may include:

— hand tools (e.g., bone folder, picks, probes, scalpels, spatulas, tweezers);

- atomizer;
- trays, tanks, and pliable screening;
- software for digital image processing;
- other apparatus, such as humidity chamber, dehumidification devices, book press or other suitable press, and any necessary chemicals;
- other supplies, blotter paper, drying racks, plate glass, or other packaging/preservation supplies.

### **4.3 Considerations and Limitations**

**4.3.1** Items submitted for examination can have limitations that interfere with the procedures in this standard. Limitations can be due to the submission of non-original documents; the condition, quantity, or comparability of the material submitted; or from limited discriminating characteristics. The FDE shall ensure that limitations are noted and recorded.

NOTE This standard may not cover all aspects of unusual, uncommon, or specialized examinations.

**4.3.2** The results of prior storage, handling, testing, or processing can adversely affect the preservation of the document(s). The document(s) should be immobilized as soon as possible to minimize damage prior to its preservation.

**4.3.3** Document examinations should be conducted prior to any destructive processing (e.g., latent prints, DNA, ink chemistry). The FDE shall handle the items as required to avoid compromising subsequent examinations. The results of prior storage, handling, testing, or processing can adversely affect the preservation of the document(s). The document(s) should be dried, frozen, or otherwise immobilized as soon as possible to minimize damage prior to its preservation.

**4.3.4** The procedures in this standard can require destructive changes to an item. Prior to making such changes, the FDE shall obtain and record permission from the responsible party requesting the examination and advise them as to the potential benefits and subsequent limitations of these examinations and the extent of possible physical changes to the document. Destructive examinations are defined in 4.6.

**4.3.5** The FDE shall ensure that material(s) removed from the item under examination shall be documented and may be imaged prior to and after removal, and preserved separately for subsequent examination(s). These materials can be of value and can include staples, other binding devices, other attached documents, and trace materials, to include any material adhered to the document(s).

**4.3.6** The FDE shall take necessary precautions to prevent disturbance of the paper fibers due to prolonged submersion.

**4.3.7** The FDE shall consider that characteristics associated with exposure to liquids may be the result of normal preparation, handling, and storage of the document(s).

**4.3.8** Some liquid soaked documents might not have observable physical characteristics or these characteristics might not be detectable based on the type of examination(s) in this standard. The absence of these characteristics does not support a determination of the condition of the documents prior to exposure to liquids.

**4.3.9** The FDE shall ensure that images are captured and documented before and after making destructive changes to the evidence or to the images of the evidence. The FDE shall contemporaneously record the procedures performed to allow for an independent review and assessment of the images by another FDE, including any relevant setting(s) and variable(s) (see *SWGDOC Standard for Use of Image Capture and Storage Technology in Forensic Document Examination*, 2013 for additional information).

#### **4.4 Procedures**

**4.4.1** The FDE shall conduct an initial assessment of the document to determine the appropriate examinations, the sequence of examinations, and the potential limiting factors.

**4.4.2** Subsequent to the completion of the initial assessment, the FDE shall proceed to the applicable examinations. The FDE may discontinue the procedure at any point during the examination. The FDE shall record the reason(s) for a discontinuation.

NOTE The remaining procedures in 4.4 need not be performed in the order listed. Not all procedures may be applicable to the item(s) being examined.

**4.4.3** The FDE shall perform applicable procedures and contemporaneously record examinations performed and relevant observations in the notes. The results and accompanying notes should have sufficient detail to allow for an independent review and assessment of the conclusions by another FDE. The FDE shall include any relevant information, observations, equipment used, methods, evaluations, and conclusions, opinions, or interpretations.

**4.4.4** The observation, examination, and preservation of a liquid soaked document(s) can include:

- a) the nature and components of the document(s);
- b) the nature of the liquid(s);
- c) the condition and extent of the effect from the liquids;
- d) if the document is charred, refer to (ANSI/ASB Standard 127, *Standard for the Preservation and Examination of Charred Documents*) for additional information;
- e) determination of the procedures to optimize preservation of the wet document(s); and
- f) determination of the procedures to optimize preservation of previously soaked documents that are presently dry.

**4.4.5** For multiple-page document(s) the FDE shall determine if the wet pages can be separated or unfolded without additional damage. This might be accomplished by manual separation or assisted by submerging the document(s) in an appropriate liquid, such as water or mineral spirits.



If the pages cannot be separated or unfolded, select a suitable drying process, such as air drying, freeze drying, or pressing.

**4.4.6** For a single-page document, the FDE shall select a suitable method, such as submersion or drying, to unfold the document(s), if necessary.

**4.4.7** For dried document(s) previously exposed to moisture, the procedures in 4.4.7.1 through 4.4.7.4 may be followed.

**4.4.7.1** Attempt to separate, if necessary, using appropriate equipment, such as bone folders, picks, probes, and tweezers.

**4.4.7.2** Attempt to flatten, if necessary, using appropriate equipment, such as presses.

**4.4.7.3** It may be necessary to rehumidify or resubmerge the document(s) prior to or during the attempt to separate and flatten the document(s).

**4.4.7.4** Rehumidification with appropriate fluids may be accomplished with an atomizer, humidity chamber, or both. When resubmerging the document(s), an appropriate container and screen should be utilized.

**4.4.8** For documents received frozen, the procedures in 4.4.8.1 through 4.4.8.3 may be followed.

**4.4.8.1** Freeze dry the document(s) and refer to 4.4.7. If time does not permit, thaw the document(s) and treat as wet document(s).

**4.4.8.2** Encapsulation of the dried document(s) upon completion, such as with polyester film, glass, or other procedures, may be advisable.

**4.4.8.3** Other forensic examinations may be conducted as required.

## **4.5 Non-destructive Examinations**

**4.5.1** The FDE shall ensure that applicable non-destructive procedures be performed.

**4.5.2** The FDE shall visually examine all sides of the item(s) macroscopically and assess the submitted item(s) to determine a need for further examination. The FDE shall perform all necessary further examinations.

**4.5.3** The FDE shall record observations, measurements, or both in the case notes, which can include but are not limited to the following:

- a) condition of liquid soaked document(s)/mass received;
- b) type of media (e.g., paper, cardboard, plastic);
- c) visualized writing, or other markings;
- d) color;
- e) extent of soaking;

- f) fastening and binding materials;
- g) manufacturing processes, packaging, or other characteristics that can aid in determination of source;
- h) trace materials present with the document;
- i) miscellaneous characteristics might aid in determination of content.

**4.5.4** The FDE shall examine the document using various optical techniques and light sources, such as side lighting, transmitted lighting, UV, IRR, and IRL.

**4.5.5** The FDE shall record the document with an imaging technique, such as photography or digital image processing.

**4.5.6** A measurement scale shall be included in the image area when photographing a submitted item.

**4.5.7** Capture conditions, including resolution, color, and bit depth, shall be permanently recorded, within the metadata or otherwise, when a submitted item is scanned.

**4.5.8** The FDE shall record visualized entries relevant to the examination.

**4.5.9** The FDE may attempt to decipher and transcribe visualized entries.

**4.5.10** The FDE shall analyze and compare the observed features and characteristics of the document to known items (if available), and evaluate the findings.

**4.5.11** The FDE shall determine the need for destructive examinations. If unnecessary, discontinue examinations, reach a conclusion(s), and report accordingly.

## **4.6 Destructive Examinations**

**4.6.1** Destructive examinations are those that damage or otherwise change the item. They should be performed after non-destructive methods have been exhausted. All findings shall be recorded in the case notes. Consideration should be given to the order in which destructive examinations are performed.

**4.6.2** Prior to conducting destructive testing, the FDE shall consult the responsible party and explain the potential benefits and limitations of the testing. The outcome of the consultation shall be recorded.

NOTE Destructive testing may consume the item(s) or otherwise limit subsequent examinations by any party.

**4.6.3** The use of destructive examinations can interfere with other types of forensic examinations (for example, chemical analysis of ink or latent print examinations).

**4.6.4** The FDE shall ensure the item is imaged before and after the use of destructive techniques as outlined in 4.3.9.

**4.6.5** When an obscuring substance is present (e.g., dried blood, oils, paint), the obscured entry can be visualized by destructive methods.

**4.6.6** When using solvents, the FDE shall ensure they are used appropriately. This may require that testing be performed prior to general application to each item in order to determine the best course of action.

**CAUTION** Exposure to solvents, in an attempt to counteract the obscuring substance, can have a deleterious effect on inks, toner, or the substrate. Refer to the Material Safety Data Sheet (MSDS) for proper application and any health and safety effects.

**4.6.7** If applicable, physically remove (for example, abrade, scrape, lift, or peel) the obscuring substance from the entry.

**4.6.8** Entries physically obscured by synthetic or biological substances (such as blood, grease, tape, or gum) may be recovered by removal of the substance after freezing.

**4.6.9** The FDE shall analyze and compare the observed features and characteristics of the document to known items (if available) and evaluate the findings.

**4.6.10** The FDE shall conduct other forensic document examinations as appropriate (e.g., handwriting comparison, typewriter comparison) resulting from observations made during or after destructive processing.

**4.6.11** Results from the procedures in this standard can be reached after the examination(s) have been conducted. The number and nature of examination(s) are dependent on the material being evaluated.

**4.6.12** Results of the above examinations, comparisons, and evaluations shall be reported accordingly.

## **4.7 Reporting**

**4.7.1** Reports generated as the result of the procedures used in this standard shall be complete and thorough. The report shall contain the stated purpose of the examination(s), the examination(s) conducted, observations, conclusions and/or opinions, limitations and sources of uncertainty (as applicable), and includes the method(s) used. Address the following, if applicable:

- a) if any characteristics indicative of liquid soaked documents, method of exposure, or determination of source, were observed;
- b) if any of the writing, entries, or markings were decipherable;
- c) the presence of any text or description of the writing, entries, or markings;
- d) the description of other materials such as packaging, binding materials, trace materials, etc.
- e) images of the writing, entries, or markings.
- f) method of preservation/packaging.

## **Annex A** **(informative)**

### **Bibliography**

The following bibliography is not intended to be an all-inclusive list, review, or endorsement of literature on this topic. The goal of the bibliography is to provide examples of publications addressed in the standard.

- 1] ANSI/ASB Standard 127, *Standard for the Preservation and Examination of Charred Documents*, First Edition, 2022
- 2] SWGDOC *Standard for Use of Image Capture and Storage Technology in Forensic Document Examination*, 2013



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