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Best Practice Recommendation for the Detection and Collection of Footwear and Tire Impression Evidence



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Best Practice Recommendation for the Detection and Collection of Footwear and Tire Impression Evidence

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Foreword

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This document was revised, prepared, and finalized as a standard by the Footwear and Tire Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Footwear and Tire Track 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 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.

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Best Practice Recommendation for the Detection and Collection of Footwear and Tire Impression Evidence

1 Scope

This document provides best practice recommendations for personnel responsible for detecting and collecting footwear and tire impressions. These recommendations optimize the detection of impressions. The methods included in this document may not cover all aspects of unusual or uncommon conditions. This document is not intended as a substitute for training in the detecting and/or collection of footwear and tire impression evidence. Completion of a training program and experience in these skills is essential to understanding and applying the recommendations outlined in this document.

2 Normative References

There are no normative reference documents. Annex A, Bibliography, contains informative references.

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1

adhesive lifter

Any material coated with a tacky substance for the purpose of lifting impressions.

3.2

alternate light source

Equipment used to produce light at various wavelengths to enhance or visualize potential items of evidence.

3.3

coaxial lighting

Illumination from the precise direction of the imaging lens (e.g. either through the lens or with a beam-splitter in front of the lens).

3.4

dry origin impression

An impression formed when the substrate, materials being transferred, and the outsole or tire tread are dry (e.g. footwear impressions in dust).

3.5

electrostatic lifting

The process of using an electrostatic charge to transfer dry origin impressions from the substrate to a film.

3.6

examination quality photograph

A photograph that contains sufficient quality of information for the purpose of conducting a forensic footwear and tire examination.

**3.7
lift**

An adhesive or other medium used to capture and preserve an impression.

**3.8
oblique lighting**

Illumination from a light source that is at a low angle of incidence, or even parallel, to the surface of the item. (Also known as **side lighting**.)

**3.9
wet origin impression**

An impression formed under wet conditions including impressions consisting of residues of blood, grease, mud and other wet substances.

4 Recommendations

4.1 Equipment

The following equipment may be used.

- a) Electrostatic Lifting Device (ESLD).
- b) Large sheets or rolls of electrostatic lifting material to conduct blind searches.
- c) Light sources of sufficient type and intensity to allow for detection of impressions.

NOTE Light sources may include natural light, incandescent light, fiber optic, fluorescent light sources, flashlights, or alternate light sources of varying wavelengths.

- d) Materials for physical and chemical enhancement.

4.2 Detection of Footwear and Tire Impressions at the Crime Scene

4.2.1 The outlined recommendations are grounded in the generally accepted body of knowledge and experience for the detection of footwear and tire impression evidence. By following these procedures, both patent and latent impressions may be detected. Footwear and tire tread impressions are detected in the field for the purposes in 4.2.1.1 through 4.2.1.3.

4.2.1.1 For future examination and comparison to a known source(s) or a manufacturer and model of footwear or tire.

4.2.1.2 For comparison with questioned impressions collected from other crime scenes and to ascertain potential investigative information such as the minimum number of subjects that may have been at a crime scene or how the subject(s) may have moved through the crime scene.

4.2.1.3 To determine position and orientation of tire impressions, direction of travel, tire track width, wheel base, turning radius, and other information that would aid in the reconstruction of events and subsequent identification of possible vehicle(s).

4.2.2 Areas or items suspected of containing footwear or tire impression evidence should be secured or protected from contamination or disturbance. Alternate routes of travel within the scene

should be established. Items of evidence should be preserved and packaged to protect the potential impression evidence.

If an area in the crime scene or item of evidence has been contaminated, this does not preclude personnel from trying to detect, preserve, and subsequently collect impressions. Partial impressions can, and often do, have evidentiary value. Personnel should secure the crime scene, document contamination, protect the item from further contamination, and proceed with the detection and collection of impressions.

4.2.3 One or more of the following procedures should be used in a sequential process with the least destructive methods used first. The determination of which methods to be utilized will be dictated by the substrate and the suspected matrix. These methods can be utilized in the field and in the laboratory. The techniques listed below are in order from least destructive to most destructive.

4.2.4 Items of evidence that potentially have footwear impressions present on them should be photographed in situ, then collected and submitted to the laboratory for processing. If an item cannot be removed it should be processed at the scene and footwear or tire impressions should be photographed and/or lifted.

4.2.5 Paper, glass, and other items that may contain latent impressions that cannot be detected in the field should be collected for later processing in the laboratory.

4.3 Visual Search

4.3.1 Look for visible impressions utilizing ambient and/or other light sources.

4.3.2 To search for two and three-dimensional impressions, utilize oblique lighting. Note that during a visual search using oblique illumination, impressions may only be visible when illuminated from a particular angle(s), necessitating the need for a thorough search.

4.3.3 Photograph any impressions detected before attempting enhancement methods.

4.3.4 Documentation of footwear and tire impressions within the scene is very important. This can be done with a combination of photography, written notes, sketches, and scanning.

4.4 Electrostatic Detection and Lifting

4.4.1 Where impressions are detected, utilize large sheets or rolls of electrostatic dust lifting film to lift the impressions. Personnel should annotate the back of the film before lifting the impression to indicate impression orientation in relation to the scene.

4.4.2 If the visual search yields no results, utilize an electrostatic lifting device to search and detect latent dust impressions. This method is noninvasive and even if unsuccessful, it does not preclude subsequent use of additional methods of detection.

4.4.3 Safeguard and collect items of evidence from the floor, such as papers, to be processed by the laboratory for latent footwear impressions. Electrostatic dust lifting devices may be used by the laboratory to locate latent dust impressions.

4.5 Physical and Chemical Development of Impressions

4.5.1 The type of substrate and matrix will dictate the selection of the processing method, with the final goal of increased contrast/visualization.

4.5.2 Figure 1 is a guideline for the most commonly encountered substrates and matrices. This is not an exhaustive list of all combinations of substrates and matrices.

4.5.3 It is recommended that a non-evidential area of the substrate be tested with each reagent to evaluate potential processing limitations such as poor de-staining, degradation of the substrate, or substrate reaction with the reagent. This is particularly important if a sequence of more than one processing technique will be applied.

4.6 Photography and Collection

4.6.1 Photograph all impressions upon detection and photograph again after processing. Examination quality photography techniques should be used.

4.6.2 If appropriate, impressions should be collected with lifting techniques and properly packaged for transport and/or storage.

4.7 Limitations

Footwear and tire evidence may have inherent limitations that can interfere with the procedures in this document. Limitations can be due to environmental factors, lighting, substrate features, and quality of the original impression(s).

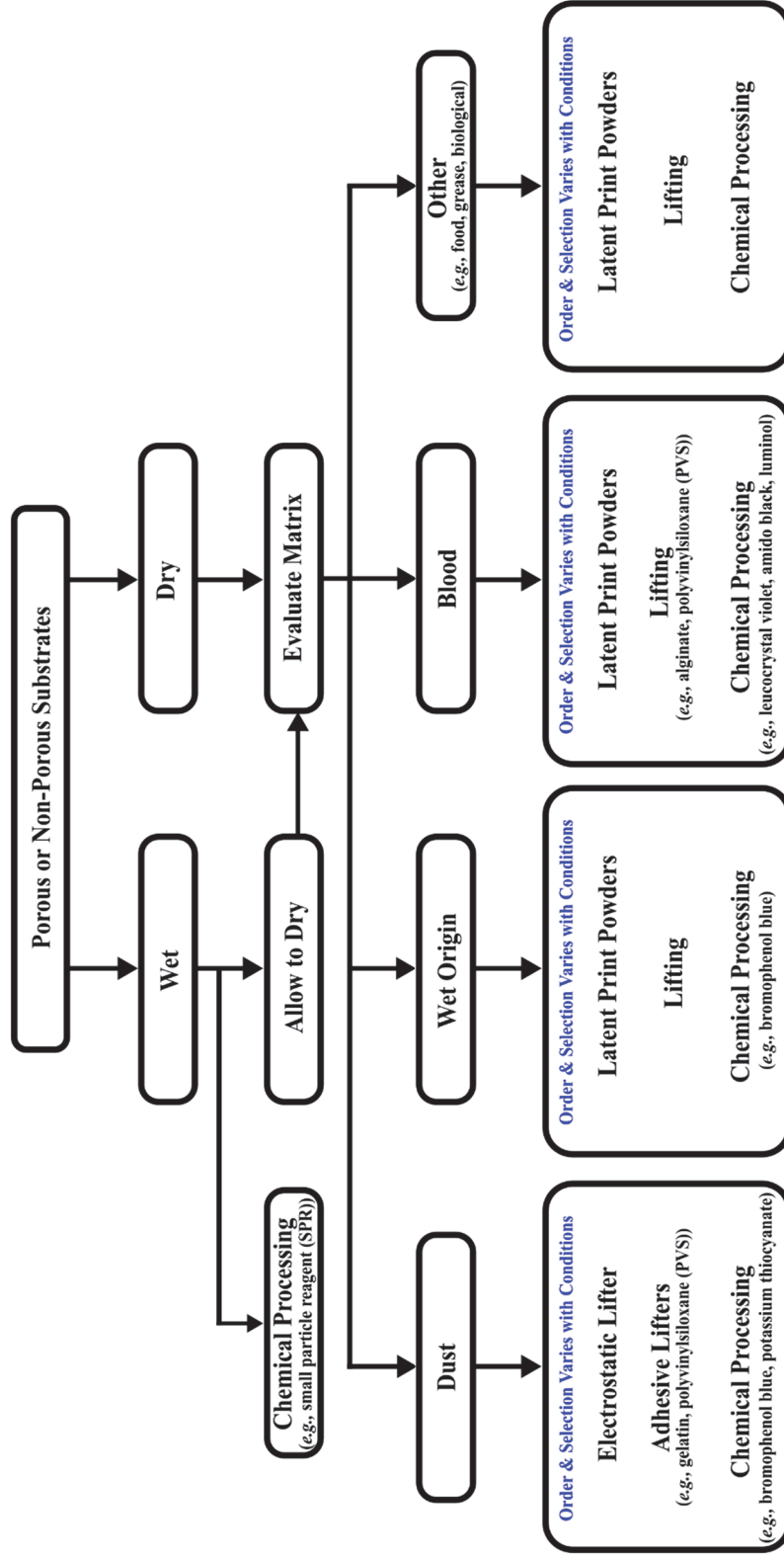


Figure 1—Flow Chart Guideline for Substrates and Matrices.

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] ASB Technical Report 097, *Terminology Used for Forensic Footwear and Tire Evidence*. First Edition 2019¹
- 2] ANSI/ASB Best Practice Recommendation 050, *Best Practice Recommendation for Photographic Documentation of Footwear and Tire Impression Evidence*, First Edition 2021²
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<http://treadforensics.com>

¹ Available from: <https://www.aafs.org/academy-standards-board>

² Available from: <https://www.aafs.org/academy-standards-board>

³ Available from: <https://www.theiai.org/>



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