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**Standard for the Forensic Examination and
Documentation of Non-firearm Tools and Non-firearm
Toolmarks**



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Standard for the Forensic Examination and Documentation of Non-firearm Tools and Non-firearm Toolmarks

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Foreword

Following these procedures, an examiner will be able to document and report the examination of non-firearm tools and non-firearm toolmarks.

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 Firearms and Toolmarks Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Organization of Scientific Area Committees for Forensic Science (OSAC) Firearms and Toolmarks Subcommittee.

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, asb@aaafs.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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Keywords: *tool, toolmark, physical examination, classification*

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Standard for the Forensic Examination and Documentation of Non-firearm Tools and Non-firearm Toolmarks

1 Scope

This document provides procedures for the examination, documentation, and reporting of non-firearm tools and non-firearm toolmarks by forensic toolmark examiners. This document does not cover the microscopic comparison of toolmarks.

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

non-firearm tool

Any tool that is not a firearm.

3.2

non-firearm toolmark

Any toolmark produced by a tool other than a firearm.

4 Requirements

4.1 General

Depending on the intended use of the information provided by the examination, differing levels of examination and documentation may be required. Laboratory policy may inform examiners as to which steps in the process are appropriate.

4.2 Equipment and Materials

The following is a non-exhaustive list of equipment and materials used to examine tools and toolmarks:

- caliper;
- camera;
- casting material;
- engraver or scribe;
- personal protective equipment;

- ruler and/or tape measure;
- stereo microscope and/or comparison microscope;
- 3D measurement systems;
- various light sources.

4.3 Test preparations

Appropriate personal protective equipment shall be used when handling evidence contaminated with chemical and/or biological hazards.

4.4 Documentation

The examination shall be documented. Acceptable forms of written or electronic documentation include, but are not limited to, worksheets, laboratory notes, sketches, photographs, or a combination thereof.

4.5 Evidence Handling

The evidence shall be marked for identification in accordance with laboratory protocols. Care shall be taken to ensure no markings interfere with or damage areas of interest, including those that may be used for comparison.

4.6 Preliminary Examination

4.6.1 A preliminary examination of the tool, item, and/or toolmark cast shall be conducted. The condition as received shall be documented, including any damage observed. If ~~severely damaged, the condition of the item precludes further examination~~ may not, the observations and rationale used to reach that conclusion shall be possible-documented.

4.6.2 The presence and location of any pertinent foreign or trace material, to include material transfer on the working surface of the tool, shall be documented. The material shall be collected and/or preserved in accordance with laboratory policy.

4.6.3 Some items may be too large or unwieldy to examine microscopically. In these instances, a cast of the tool and/or toolmark may be produced for microscopic examination. Casts may also be produced to improve the visibility of the toolmark under the microscope, especially with translucent or highly reflective materials.

4.6.4 For items that are suitable for further examination, proceed with the steps in 4.7 that are appropriate for the item type.

4.7 Physical Examination and Documentation

NOTE It may be necessary and/or appropriate to label the tool working surface(s) and/or the item to facilitate documentation.

4.7.1 Documentation of the tool shall include the following, ~~if known~~:

- a) type of tool (e.g., hammer, bolt cutters);
- b) brand;
- c) model;
- d) action type(s) (e.g., cutting, prying, pinching, shearing);
- e) size;
- f) dimensions/shape of working surface(s);
- g) manufacturing process that created the working surface(s) (e.g., ground, cast, stamped, milled);
- h) damage to the working surface(s).

4.7.2 Documentation of the toolmark and/or cast shall include the following, ~~if known~~:

- a) description of item bearing the toolmark(s);
- b) location and orientation of toolmark(s);
- c) composition of substrate(s) (e.g., steel, plastic, wood);
- d) dimensions/shape of the toolmark(s);
- e) type (impressed and/or striated);
- f) direction of tool movement;
- g) tool action type, if discernible (e.g., cutting, prying, pinching, shearing);
- h) presence or absence of potential individual characteristics and their value for microscopic comparison.

4.7.3 The examiner shall document when items listed in 4.7.1 and 4.7.2 cannot be determined.

4.8 Report Wording

The report shall include a description/physical classification of any tools, toolmarks, and/or casts of toolmarks that are examined, as appropriate. The report shall include a statement specifying whether, given the condition of the item, further examinations have been ruled out or remain possible.

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] *Association of Firearm and Toolmark Examiners Glossary*, 6th Edition, Version 6.110619 ¹.
- 2] Klees G.S., "The Categorization of Toolmarks and Tool Types." *AFTE Journal*, 2017 Spring; 49(2) (Spring): 91-103 ².
- 3] Miller J., "An Introduction to the Forensic Examination of Toolmarks." *AFTE Journal*. 2001 July; 33(3): 233-248 ².

¹ Available from: https://afte.org/uploads/documents/AFTE_Glossary_Version_6.110619_DRAFT_.PDF

² Available from: <https://afte.org/afte-journal>

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