

TENNESSEE BUREAU OF INVESTIGATION
Forensic Services Division

Firearms/Toolmarks Standard Operating Procedures Manual
Toolmark Tests and Casting Procedure



20.0 TOOLMARK TEST STANDARDS AND CASTING METHODS

20.1 Scope: This method will detail how test toolmarks and castings are produced.

20.2 Precautions/Limitations: None

20.3 Related Information:

20.3.1 Microscopic Comparison Methods 16

20.3.2 Physical Examination and Classification of Tools and Toolmark Methods 19

20.3.3 Range of Conclusions Appendix 4

20.3.4 Verification of Casework Appendix 8

20.4 Instruments:

20.4.1 Stereomicroscope

20.4.2 Comparison Microscope

20.5. Reagents/Materials:

20.5.1 Accu-Trans Silicone Casting Material

20.5.2 Lead Sheets

20.5.3 Lead Wire

20.6 Hazards/Safety:

20.6.1 It is the responsibility of the firearm examiner to employ appropriate safety and health practices.

20.7 Reference Materials/Controls/Calibration Checks:

20.7.1 All controls and calibration checks shall be performed in strict accordance to those listed in the Performance Checks and Maintenance Appendix 7.

20.8. Procedures/Instructions:

20.8.1 Test Mark or Test Cut Method

20.8.1.1 The initial test media must be soft enough to prevent alterations of the tool's working surface. Lead sheet or lead wire is the preferred media.

20.8.1.2 The firearm examiner may use material submitted by the submitting agency which was collected as "test" material.

20.8.1.3 Subsequent tests might require the use of a harder test media to better reproduce

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the toolmarks.

20.8.1.4 A systematic approach should be used for the production of test toolmarks. Consideration should be given to:

- Areas of recent use on the tool in question.
- Direction of use.
- Direction of force.
- Indexing of test toolmarks

20.8.2 Casting Method

- Prepare the casting material as per manufacturer's specifications.
- Place the casting material over the toolmark to be cast.
- Allow the cast the appropriate amount of time to cure.
- Gently lift the cast off the toolmark.
- A systematic approach should be used for the production of test toolmarks. Consideration should be given to:

- Areas of recent use on the tool in question
- Direction of use
- Indexing of test standards/marks

- Consideration must be given to placing identifying marks as well as orientation marks on the back of the cast.

20.8.3 All test toolmarks, test cuts, or casts will be treated like test fires and shall follow the guidelines in the Test Fire Appendix 10.

- The test box will be marked with the laboratory number, tool exhibit number, and "test toolmarks, test cuts, test marks, or casts" for ease of identification.

20.9. Records: The firearm examiner shall document their findings in the form of handwritten notes, computer generated notes, photography, or by utilizing a worksheet.

20.10 Interpretations of Results: None.

20.11 Report Writing: Most toolmark report writing can be found in the Range of Conclusions Appendix 4.

20.12 References:

Association of Firearms and Toolmark Examiners Glossary, 5th Edition, 2007.

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Cassidy, Frank, "Replication of Identifying Marks When Using Mikrosil Castings", AFTE Journal, April 1993, Vol. 25, No. 2, pgs. 130-131.

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