Section 5 Microscopic Comparison

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Revision #	Effective date	History
0	**1/12/07**	**This is an original procedure this procedure has been completely reformatted and updated from the previous procedure that was adopted from the Washington State Patrol.**

Section 5 Microscopic comparison

5.0 Scope and Background

A comparison microscope allows an examiner to identify components back to a firearm that produced markings or identify a toolmark back to the tool that produced the mark. The evidence component is placed on one stage of the microscope, and the known is placed on the other stage. This procedure may also be used to compare two unknowns to determine if the same source produced the marks.

5.1 Equipment (refer to section 9 for details on calibration and maintenance of equipment)
Comparison Microscope
Stereo Microscope

5.2 Procedures

5.2.1 Comparison Microscope Set-up Procedure

5.2.1.1 Select the same objective (magnification) setting and ensure that the objectives are locked in place.
5.2.1.2 Select the same set of oculars.
5.2.1.3 Adjust illumination as needed.

5.2.2 Analysis of Comparisons

5.2.2.1 If the suspect tool or firearm is submitted, test fires from the firearm or test produced from the tool should first be compared to determine what microscopic characteristics are reproduced
5.2.2.2 Compare the unknown evidence to either another piece of unknown evidence or a known test by placing the unknown on the left-hand stage and the known test on the right-hand stage.

5.2.3 If an identification is not evident

Consideration should be given to the following:

- Angle of lights
- Type of lights
- Need for additional known test samples
- Position of the evidence, the tests, or both
- Using magnesium smoking
- The possibility that the tool has changed
- Cleaning the firearm or toolmark and producing additional tests
- The possibility that a different tool or firearm was used

5.3 Interpretation and limitations or results

5.3.1 Identification

Criteria: Agreement of a combination of individual characteristics and all discernable class characteristics where the extent of agreement exceeds that which can occur in the comparison of toolmarks made by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool.

Documentation: A photo will be taken to document identification along with notes describing how the identification was made.

It is recognized that photos are not used to make identifications or comparisons but are a means for recording purposes and generally document selected portions of and identification.
Photos are not used to make comparisons and make conclusions because:

- A photograph is a two-dimensional image of an object that is three-dimensional.
- Photographs often contain insignificant detail which will confuse people not trained in microscopic comparison.
- A photograph is a still. An actual comparison is very dynamic, and continuous movement of the samples is an integral part of the examination.

5.3.2 Inconclusive

Criteria:

- Some agreement of individual characteristics and all discernable class characteristics, but insufficient for an identification or elimination.
- Agreement of all discernable class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency or lack of reproducibility.
- Agreement of all discernable class characteristics and disagreement of individual characteristics, but insufficient for an elimination.

Documentation: When an item is reported as inconclusive, detailed descriptions will be used to document class characteristics and describe why the sample is inconclusive.

5.3.3 Elimination

Criteria: Significant disagreement of discernable class characteristics and/or individual characteristics.

Documentation: Detailed notes describing class characteristics and individual characteristics.

5.4 Technical Verification

Technical verification is a process of independently performing a comparison or analyzing evidence to determine if the reviewer comes to the same conclusion regarding the analysis as the analyst.

Technical verification will be performed on all conclusions in which individual characteristics contribute to the conclusion. (for example an elimination based on class characteristics does not require technical verification, but an inconclusive result based on matching class characteristics but insufficient individual characteristics does).

5.5 Safety Considerations

This procedure involves hazardous materials, operations and equipment. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution must be exercised and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

5.6 References

"5 Microscopic Comparisons of Firearms" Firearms and Toolmarks Procedure Manual. Virginia Division of Forensic Science. Amendment B.

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