

**A. Purpose:**

To describe the steps to perform an examination of evidence using a comparison microscope. These procedures apply to both the examination of fired ammunition components and to tool marks.

**B. Responsibility:**

Forensic Science Examiners assigned to the Firearms Unit.

**C. Safety:**

Evidence items for comparison should be decontaminated prior to using a comparison microscope.

**D. Procedure:**

The procedure steps below do not have to be performed in the order listed; however, all steps should be considered and/or addressed:

1. Ensure that the objectives are set for equal magnification for both stages of the comparison microscope.
2. Adjust the illumination as needed. Oblique lighting is usually preferred.
3. The evidence should be cleaned prior to examination to provide the best possible clarity of the markings. Cleaning techniques can include acetone or alcohol using a damp swab.
4. Adopt a consistent procedure for comparing knowns to unknowns, e.g. tests on the left stage and evidence on the right stage, or vice versa.
5. Compare the unknown evidence to another item of unknown evidence if present evaluating the markings present. The unknown evidence will be examined first prior to proceeding to any comparisons to knowns submitted. It may be helpful to list groupings associated with the same firearm based on the individual characteristics noted and reporting the groupings in the report for the submitting agency to recognize if multiple weapons are involved.
6. If a firearm is test fired or agency test fires are included as evidence, the test fires will be microscopically compared to each other to determine if repeatable tool marks are present that are suitable to move forward for comparison. The test fires selected for comparison will be indicated on QR-FA-20.
7. Consider the possibility of subclass characteristics on tests or on the evidence.
8. Compare the unknown evidence to the known evidence if present.
9. If a conclusion cannot initially be reached, the analyst should consider the following factors:
  - i. The angle of lights

- ii. The type of lights
  - iii. The need for additional tests
  - iv. The position of the test and/or evidence on the microscope
  - v. The possibility of needing to clean the firearm
  - vi. The possibility that the firearm or tool itself has changed
10. Comparisons of evidence will be adequately documented to support the conclusions reached. This can be in the form of photographs, written notes, or a combination of both.
11. If an examination results in either an identification or an elimination based on individual characteristics, a second examiner must verify the findings. Refer to the steps outlined in FA SOP-24 Verifications.

**E. References:**

- 1. GL 2 Safety Manual
- 2. FA SOP-25 Range of Conclusions
- 3. FA SOP-24 Verifications