

Firearms/Toolmarks Discipline

Technical Procedure for Physical and Visual Examinations

1 Scope

This procedure is designed for the evaluation and examination of physical and/or electronic evidence to determine whether items may be physically consistent with an item, reference sample, or test item based on the class and/or physical characteristics. This procedure applies to personnel conducting forensic examinations in the Firearms/Toolmarks Discipline (FTD).

The following terms will be used throughout the procedure:

- ***Physical Characteristics***: Observable features of a specimen which indicate a restricted group source and are determined prior to manufacture (e.g., shape, color, design).
- ***Class Characteristics***: Measurable or discernible features of a specimen which indicate a restricted group source. They result from design factors, including acceptable variability within manufacturer tolerances and are determined prior to manufacture.

2 Equipment/Materials/Reagents

- 3D topographical instruments
- Casting media
- Certified Reference Material
- Computer
- Measurement equipment
- Microscope (stereozoom/comparison)
- Personal Protective Equipment (PPE)
- Test media (e.g., lead, brass, copper)

3 Standards and Controls

Exemplars derived from evidentiary items during examination and reference materials serve as controls. When available, the following reference materials may be used:

- Reference Firearms Collection
- Reference Ammunition File
- General Rifling Characteristics database
- Other Government Agency databases
- Manufacturer's catalogues/literature
- Purchased databases
- Published literature
- Open source information

4 Performance Checks

Performance checks on measuring devices are required when those measurements may be utilized to make judgements regarding the further examination, classification, or comparison of an item, or to form conclusions regarding the item. See *FTD Technical Procedure Measurement, Calibration, Performance Check and Maintenance of Equipment*. When measurements are taken simply to document the physical size or shape of an item, performance checks are not required.

5 Sampling

Not Applicable.

6 Procedures

6.1 Examination of Physical Evidence

6.1.1 Physical evidence is defined for these procedures as an item submitted for comparison based upon its class characteristics. Physical evidence can include various evidentiary items (e.g., photographs, tools, toolmarks, metal components, cartridges, bullet components, electronic files saved to disc).

6.1.2 If the physical evidence appears to have potentially probative trace evidence of value, consult with a trace evidence Examiner. If the trace evidence is determined to be of potential value, it will be preserved and recorded. Coordinate the removal and preservation of the trace evidence with a trace Examiner from the appropriate unit.

6.1.3 Ensure that evidence is marked in accordance with the provisions of the *FBI LOM Assigning Cases and Examination of Evidence*.

6.1.4 Determine any class and/or physical characteristics features of the physical evidence:

- Weight
- Height
- Length
- Width
- Material description
- Manufacturer information
- Type of action
- Design features
- Color, texture, mold marks, obvious alterations, etc

6.2 Examination of Electronic Evidence

6.2.1 Electronic evidence (e.g., photographs and electronic files saved to disc) is defined for these procedures as an item and/or request submitted for examination based on its class characteristics.

6.2.2 Ensure the electronic evidence, when printed or copied, is labeled with the appropriate item identifiers.

6.2.3 Determine any class characteristics or observed features of the electronic evidence.

6.3 Conclusions of Class Characteristics Comparisons

6.3.1 Compare the class and/or physical characteristics of the evidentiary item to the class and/or physical characteristics of an item, reference sample, or test item. Conclusions will reflect one of these possibilities:

- a. Elimination - the physical dimensions and/or design features of the evidentiary item is significantly different with an item, reference sample, or test item.
- b. Inconclusive – the physical dimensions and/or design features present for comparison are insufficient to form an opinion as to whether the evidentiary item is physically consistent with an item, reference sample, or test item.
- c. Association – the physical dimensions and/or design features of the evidentiary item is physically consistent with an item, reference sample, or test item.

6.4 Secondary Evidence

Any secondary evidence derived from a physical and visual examination will be marked, recorded, and returned in accordance with the provisions of the *FBI Laboratory Quality Assurance/Operations Manuals* and the *FTD QAM Marking and Examination of Evidence*.

7 Calculations

When physical evidence is presented with a different dimensional scale than the reference item (object vs. photo), the comparison ratio calculation is suitable for comparison purposes.

$$\text{Comparison ratio: } \frac{A \text{ (short measurement)}}{B \text{ (long measurement)}}$$

8 Measurement Uncertainty

Not Applicable.

9 Limitations

A physical and visual examination is not for the purpose of source identification. An association conclusion of “physically consistent with” indicates a relationship regarding the evidence. Examinations of electronic evidence may be impacted by data quality and size of the item(s) in question.

10 Safety

Based upon the type of item(s) being submitted, appropriate safety measures should be employed during the examination. When handling physical evidence, the Examiner(s) or appropriately trained personnel should be mindful of the potential for biological hazards and take the necessary precautions.

Consult the *FTU Safety Protocols for Handling of Firearms and Ammunition* located in Appendix A of the *FTD Technical Procedure Firearm Examinations*.

11 References

FBI Laboratory Quality Assurance Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

FBI Laboratory Operations Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

“SWGGUN Admissibility Resource Kit (ARK).” Resources, The Association of Firearm and Tool Mark Examiners. Web, Accessed 6 March 2021.

| Rev. # | Issue Date | History |
|--------|------------|--|
| 6 | 03/02/20 | Renamed and updated to reflect new name of document. Titles of reference FTD documents updated as needed. Minor edits for grammar and clarity throughout. Association Examinations renamed throughout the document to reflect new exam name "Physical and Visual Examination". Updated Scope to be consistent with Class Characteristic Conclusions in Section 6.3. Section 2 updated. Section 4 Performance Checks added. Expanded Section 6.1.4 to include additional class characteristics. Section 6.3 updated for consistency and 6.3.1(c) added to define an association conclusion. Section 8 Limitations also updated. SWGGUN ARK reference updated. Titles of reference FTD documents updated where needed. |
| 7 | 04/15/21 | Removed categories of testing and updated technical procedure titles throughout document. Added 'material description' to Section 6.1.4; Updates to formatting in Section 6.21 and 6.2.3. Revised Limitations section. Updated reference to SWGGUN ARK. |

Approval

Redacted - Signatures on File

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