



ATF-LS-FT7 Physical Match	Published Online: March 2018
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I. Scope

Through a comparison of fractures and surface profiles, it is possible to determine whether two separate surfaces were once joined. These guidelines set forth the procedure by which portions of firearm components, tools, and other items of evidence can be examined to determine if the portions were once joined together. This protocol is applicable to all ATF Firearm and Toolmark Examiners.

II. References

Clayton, L. Davis, A. "Validation of Fracture Matching Through the Microscopic Examination of the Fractured Surfaces of Hacksaw Blades." *AFTE Journal*, 42(4), pp. 323 - 344.

DeForest, P., Gaensslen, R., and Lee, H. *Forensic Science, An Introduction to Criminalistics*, Chapter 11. McGraw Hill, 1983.

Katterwe, H. "Fracture Matching and Repetitive Experiments: A Contribution of Validation." *AFTE Journal*, 37(3), pp. 229-241.

Kirk, P. *Crime Investigation*, Chapters 9, 17, and 20. Interscience Publishers, New York, NY, 1953.

Miller, J. and Kong, H. "Metal Fractures: Matching and Non-Matching Patterns." *AFTE Journal*. 38(2), Spring 2006, pp. 133-165.

Orench, J. "A Validation Study of Fracture Matching Metal Specimens Failed in Tension." *AFTE Journal*. 37(2), pp. 142-149.

Saferstein, R. *Criminalistics, An Introduction to Forensic Science*, Chapter 3. Prentiss Hall, New York, NY, 1987.

III. Safety Precautions

See ATF-LS-FT8 Firearms Safety Guidelines. When working with sharp or jagged objects, hand and eye protection should be worn.

IV. Apparatus/Reagents

Stereo and comparison microscope(s), micrometers, calipers, rulers, casting media, and photographic equipment.

V. Procedure

See ATF-SL-FT9 Firearm and Toolmark Examination and Documentation for minimum required documentation and supplemental documentation depending on the purpose for which the firearm was submitted for examination.

The wide variety of items that could be submitted for a physical match comparison varies sufficiently that each should be considered on its own merit. In general, the following guidelines

apply:

- Record physical properties of item(s) to be compared (such as but not limited to: color, material type, dimensions, etc.).
- Determine and record type of separation (Examples include, shear, cracked, and torn).
- Determine and record that class characteristics of items are compatible.
- Evaluate shape of separation and check for any surface features that may be continuous on both sides of the separation.
- If item is of suitable thickness, examine the surface of the face of the separation to determine if the parts were once one item.
- If all the class characteristics agree, compare all fractured surface visually and/or microscopically to determine if they were once joined.

VI. Quality Control

Reliable results are ensured when equipment is properly calibrated and maintained and the examiner appropriately assesses the significance of the various characteristics being observed.