



<b>ATF-LS-FT4</b> <b>Serial Number Restoration</b>	Published Online: <b>March 2018</b>
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## Scope

These guidelines establish a standard approach to restoring obliterated serial numbers and other obliterated markings. This method of analysis is applicable in all ATF Firearm and Toolmark Examiners.

## References

Bureau of Alcohol, Tobacco and Firearms National Firearms Examiner Academy Student Manual.

Brandt, D. *Metallurgy Fundamentals.*, Goodheart-Wilcox Company, Inc., 1992.

Mathews, J. *Firearms Identification*. Volume I. The University of Wisconsin Press, Madison, WI, 1962, pp. 77-80.

Treptow, R. *Handbook of Methods for the Restoration of Obliterated Serial Numbers*. NASA, January 1978.

Turley, D. "Restoration of Stamps Marks on Steel Components by Etching and Magnetic Techniques." *Journal of Forensic Science*. 32(3), May 1987.

## Safety Precautions

Protective clothing, gloves, eye protection, eyewash, acid spill kit, fume hood. See also Laboratory Services Firearms Safety Manual.

## Apparatus/Reagents

**Magnetic Metals:** Various etching reagents, prepared iron particle bath, clear coating, magnetic yoke, magnifying lamp, and magnets.

**Non-Magnetic Metals:** Various etching reagents, clear coating, cotton swabs, magnifying lamp, stereo microscope, camera, power source, assorted bottles and beakers.

## Procedures

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

As necessary for examinations of the firearm for other than restoration of obliterated markings see ATF-LS-FT1 Examination of Firearms.

Mark firearm in such a way as to allow for any future recognition or identification.

Photograph the suspected obliterated serial number area.

Conduct a visual and/or microscopic examination of the obliterated area and record any observations.

If trace of potential evidentiary value is observed, follow appropriate laboratory guidelines for collection and preservation.

If preliminary examination reveals the presence of toolmarks suitable for comparison, a cast should be taken, packaged appropriately and returned with the evidence. Determine whether the surface to be processed is magnetic or non-magnetic. Preparation and restoration techniques, as well as the order in which they are performed, will vary according to metal, specifically magnetic or non-magnetic, type, and severity of obliteration.

Surface preparation of the obliterated area should be conducted to maximize the effectiveness of the restoration technique. However, it may not always be necessary if the obliterated area appears smooth.

Utilize personal protection equipment as needed.

Begin restoration processing utilizing any of the below techniques as described in Treptow (1978) reference:

- Magnetic Particle Method
- Chemical Etching
- Electrolytic
- Document results.

### **Quality Assurance**

Chemical etchant reagents should be prepared in accordance with the reference literature formulations. Records identifying who made the reagent and the date of preparation shall be maintained.

Initial testing of a reagent(s), prior to casework, requires that one of the following be observed when testing the reagent on an appropriate control: chemical reaction in the form of gas liberation, bubbling

or a color change in the metal (Other reactions might be possible). The results of reliability testing shall be recorded.

Continued reliability testing of reagents can occur through use in casework. Should it be determined that a reagent is not reacting reliably or as expected (as described above), the reagent will be discarded immediately and a fresh reagent will be prepared and tested as indicated above. The use of an expired reagent is not detrimental to a test result, so a new reagent(s) may be subsequently utilized in the same location.

Reagents may be used indefinitely as long as their continued reliability is monitored during casework.