

**TENNESSEE BUREAU OF INVESTIGATION**  
*Forensic Services Division*

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Firearms/Toolmarks Standard Operating Procedures Manual  
Ammunition Component Classification and Examination Procedure

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**12 AMMUNITION COMPONENT CLASSIFICATION AND EXAMINATION PROCEDURE**

**12.1 Scope:** These procedures address the examination of fired bullets. The firearm examiner may be able to determine the caliber, type, manufacturer, and whether the fired bullet has markings suitable for comparison.

**12.2 Precautions/Limitations:** The measurements taken are estimates and the firearm examiner shall use the best available method to obtain these measurements. Some manufacturers might duplicate the design of another manufacturer.

**12.3 Related Information:**

- 12.3.1 Caliber Determination Procedure 13
- 12.3.2 Range of Conclusions Appendix 4
- 12.3.3 Ammunition Reference Collection Appendix 6
- 12.3.4 Performance Checks and Maintenance Appendix 7
- 12.3.5 Worksheets Appendix 1

**12.4 Instruments:**

- 12.4.1 Calipers
- 12.4.2 Digital Micrometer
- 12.4.3 Unitron Measuring Projector
- 12.4.4 Stereo Microscope
- 12.4.5 Balance

**12.5 Reagents/Materials:** None

**12.6 Hazards/Safety:**

**12.6.1** It is the responsibility of the firearm examiner to employ appropriate safety and health practices.

**12.7 Reference Materials/Controls/Calibration Checks:**

**12.7.1** All controls and calibration checks shall be performed in strict accordance to those listed in the Performance Checks and Maintenance Appendix 7.

**12.8. Procedures/Instructions:**

**12.8.1** Document the original packaging and seals of the evidence containers.

**12.8.2** Mark the outside of the original packaging with the case number, exhibit number and examiner's initials.

**12.8.3** Determine if the request for examination form indicates a request for forensic biology or latent fingerprint examination or if such an examination is necessary. If determined that

# TENNESSEE BUREAU OF INVESTIGATION

## Forensic Services Division

---

### Firearms/Toolmarks Standard Operating Procedures Manual

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---



biological or fingerprint examination is necessary, transfer the evidence to that unit prior to examining.

**12.8.4** Check the calibration of the balance, calipers, and/or digital micrometer according to the methods detailed in the Calibration Standards Appendix 7. All results of performance checks shall be recorded in the case notes.

**12.8.5** To accurately characterize a bullet, the firearm examiner shall record the following data on the bullet worksheet:

- The number of land and groove impressions present. If the bullet is damaged, it may be necessary to calculate the number of land and groove impressions by utilizing the following formula:
  - $\#LAG = \text{Diameter} \times \pi / (\text{width of one land impression} + \text{width of one groove impression})$
- The direction of twist.
- The measured width of the land and groove impressions.
- The approximate bullet weight recorded in grains.
- The base measurement of the bullet, if possible.
- The bullet design and composition (E.g., FMC, TMJ, LRN, LSWC, Nyclad, TMJ, etc.).
- The possible manufacturer or marketer of the bullet based on weight and design features (E.g., Winchester SilverTip, Speer Gold Dot, etc.).
- The type and number of cannelures present.
- The condition of the fired bullet. Condition may include:
  - Damage present on the bullet.
  - Is the base flared? A flared base indicates a short barrel.
  - Any deformity, marring, or distortion of the bullet.
- The presence of trace material or contamination.
- Description may also include:
  - Is the exhibit recognizable as a fired bullet or part of a bullet?
  - If lead composition with no land or groove impressions visible, could the item be a bullet core?
- Notes may also include:

# TENNESSEE BUREAU OF INVESTIGATION

## Forensic Services Division

---

### Firearms/Toolmarks Standard Operating Procedures Manual

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---



- All extraneous marks (secondary scratching, shaving, etc.)
  - The presence of skidding, slipping, or misalignment.
  - A description of the base of the bullet.
  - Anything unusual with the shape or design of the jacket (E.g., Star shaped hollow point, black anodized surface, etc.).
  - If the bullet/projectile is a fragment, is it possible to fracture match the fragment to other bullet/projectile fragments in the case.
  - Note if there is any gunpowder adhering to the base.
  - Location of identifying marks placed on the bullet.
- Whenever possible the firearm examiner shall mark the bullet away from important markings with the laboratory case number, exhibit number, and initials. If the bullet or fragment is too small to mark, the proximal container may be marked with laboratory number, exhibit number, and initials. This should be indicated in the case notes.
- A sketch, photograph, or photocopy of evidence bullet(s) is required and may assist an examiner when reviewing notes for court. There is space provided on the bullet worksheet for a sketch or photograph of the bullet/projectile(s), or a separate piece of paper may be used.

**12.9 Records:** The firearm examiner shall document their findings in the form of handwritten or computer generated notes, on bullet worksheets, or photographically.

#### **12.10 Interpretations of Results:**

**12.10.1** Caliber is written as a numerical term.

**12.11 Report Writing:** Ammunition component report writing can be found in the Range of Conclusions Appendix 4.

#### **12.12 References:**

Association of Firearm and Tool Mark Examiners Training Manual, March 3, 2001

Association of Firearm and Tool Mark Examiners Procedures Manual, July 9, 2001

Association of Firearm and Tool Mark Examiners Glossary, 5<sup>th</sup> Edition, 2007

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Prieto, Michael, "Firearms Identification Lesson #4," AFTE Journal, July 1982, Vol. 14, No. 3, pgs. 46-68.

**TENNESSEE BUREAU OF INVESTIGATION**  
*Forensic Services Division*

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---



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Mann, Espinoza, Ralston, Stroud, Scanlan, and Strauss, "Shot Pellets: An Overview", AFTE Journal, July 1994, Vol. 26, No. 3, pgs. 223-241.

Barnes, Frank C., Cartridges of the World, 12th Edition, 2009.