



# **TENNESSEE BUREAU OF INVESTIGATION**

## *Forensic Services Division*

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### Firearms/Toolmarks Standard Operating Procedures Manual Cartridge Case/Shotshell Case Examination

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#### **14 CARTRIDGE CASE/SHOTSHELL CASE EXAMINATION PROCEDURES**

**14.1 Scope:** This procedure addresses the examination and classification of fired cartridge cases and shotshell cases. The firearm examiner may be able to determine the caliber, gauge, type, manufacturer, and whether the fired cartridge case or shotshell case has markings suitable for comparison. This procedure may also be used to examine unfired ammunition and/or components.

**14.2 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, or use components purchased from another manufacturer. Care should be taken to assess for reloaded ammunition.

#### **14.3 Related Information:**

- 14.3.1 Caliber Determination Procedure 13
- 14.3.2 Range of Conclusions Appendix 4
- 14.3.3 Ammunition Reference Collection Appendix 6
- 14.3.4 Calibration Standards Appendix 7
- 14.3.5 Worksheets Appendix 1

#### **14.4 Instruments:**

- 14.4.1 Calipers
- 14.4.2 Micrometer
- 14.4.3 Stereo Microscope
- 14.4.4 Comparison Microscope
- 14.4.5 Balance

**14.5 Reagents/Materials:** None

#### **14.6 Hazards/Safety:**

**14.6.1** It is the responsibility of the firearm examiner to employ appropriate safety and health practices. Safe firearm handling procedures shall be strictly followed at all times.

#### **14.7 Reference Materials/Controls/Calibration Checks:**

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

#### **14.8 Procedures/Instructions:**

##### **14.8.1 Cartridge Case/Cartridge Examination**

- Document the original packaging and seals of the evidence containers.

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- Mark the outside of the original packaging with the case number, exhibit number and examiner's initials.
- 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 biological or fingerprint examination is necessary, transfer the evidence to that unit prior to examination.
- Document the evidence contained within the packaging.
- To accurately characterize a cartridge case, the firearm examiner may record the following data on the Cartridge Case worksheet or in the case notes, if applicable:
  - The caliber, commonly found on the headstamp, but may be determined or confirmed through comparison with known standards.
  - Headstamp information and the possible manufacturer and/or marketer.
  - Description of cartridge case and primer composition/finish.
  - Presence and type of sealant.
  - Description of the ignition system (E.g., centerfire, rimfire, etc.).
  - Shape of cartridge (E.g., Pistol, Revolver, Belted, Rimmed, etc.).
  - Number and type of cannelures.
  - Description of the firing pin impression.
  - Description of the breechface marks.
  - Description of the extractor and ejector marks.
  - Presence and location of any visible trace material.
  - Description of other markings, to include: resizing marks, chamber marks, magazine marks, ejection marks, and any other marks of value.
- Whenever possible the firearm examiner shall mark the cartridge case away from important markings with the laboratory case number, exhibit number, and initials.

#### **14.8.2 Shotshell Case Examination and Characterization**

- Document the original packaging and seals of the evidence containers.
- Mark the outside of the original packaging with the case number, exhibit number and examiner's initials.
- 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 biological or fingerprint examination is necessary, transfer the evidence to that unit prior to examination.
- Document the evidence contained within the packaging.

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- To accurately characterize a shotshell, the firearm examiner may record the following data on the Shotshell Worksheet or in the case notes, if applicable:
  - The caliber or gauge, commonly found on the headstamp, but may be determined or confirmed through comparison to known standards.
  - Headstamp information and the possible manufacturer and/or marketer of the shotshell.
  - Description of case hull and primer finish.
  - Presence and type of sealant.
  - Note high or low brass.
  - Presence and descriptions of load markings.
  - Chamber length.
  - Shotshell crimp type.
  - Description of the firing pin impression.
  - Description of the breechface marks.
  - Description of the extractor and ejector marks.
  - Presence and location of any visible trace material.
  - Description of other markings, to include: resizing marks, chamber marks, magazine marks, ejection marks, and any other marks of value.
- Whenever possible the firearm examiner shall mark the shotshell case away from important markings with the laboratory case number, exhibit number, and initials.

**14.9 Records:** The firearm examiner shall document their findings in the form of handwritten or computer generated notes. Photography or photocopying of the evidence may assist the examiner in documentation. The examiner shall strictly adhere to all note taking procedures as prescribed by laboratory policy.

**14.10 Interpretations of Results:**

**14.10.1** Shot size is written as a numerical term.

**14.11 Report Writing:** Most ammunition characterization report writing can be found in the Range of Conclusions Appendix 4. However, submitted ammunition components may be unusual or in very poor condition and these Range of Conclusions may not apply.

**14.12 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.

Ernest, Richard, "Exploring the Possibility of Matching Fired Shotgun Ammunition Components to Unaltered Shotguns," AFTE Journal, January 1992, Vol. 24, No. 1, pgs. 28-36.

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Felix, Kyle, "Using Bullet Weights and Type to Determine Caliber and Brand," AFTE Journal, Winter 2008, Vol. 40, No. 1, pgs. 64-80.

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, various editions.

CartWinPro software.