15 SHOTSHELL COMPONENT EXAMINATION PROCEDURES

15.1 Scope: This procedure addresses the examination and classification of fired shotshell components. The firearm examiner may be able to determine the gauge, type, manufacturer, and whether a fired shot wad has markings suitable for comparison. This procedure also describes the determination of shot sizes.

15.2 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.

15.3 Related Information:

15.3.1 Caliber Determination Procedure 13
15.3.2 Range of Conclusions Appendix 4
15.3.3 Ammunition Reference Collection Appendix 6
15.3.4 Performance Checks and Maintenance Appendix 7
15.3.5 Worksheets Appendix 1

15.4. Instruments:

15.4.1 Calipers
15.4.2 Micrometer
15.4.3 Stereo Microscope
15.4.4 Balance
15.4.5 Comparison Microscope

15.5 Reagents/Materials: None

15.6 Hazards/Safety:

15.6.1 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.

15.7 Reference Materials/Controls/Calibration Checks:

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

15.7.2 Ammunition Reference Collection.

15.8 Procedures/Instructions:

15.8.1 Shotgun Wadding Examination

- 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 forensic biology or fingerprint examination is necessary, transfer the evidence to that unit prior to examining.

- Document the evidence contained within the packaging.

- Directly compare the evidence shot wad to known laboratory standards of similar composition, type, and design to determine manufacture and type of wadding (E.g., Winchester AA, Remington Power Piston, etc.). For gauge determination, directly compare the base of the evidence shot wad to the bases of the standards until a similar size is found.

- Check the calibration of the calipers and balance according to the methods detailed in the Performance Checks and Maintenance Appendix 7. All results of performance checks shall be recorded in the firearm examiner's notes.

- Measure the base diameter of the wad and compare these measurements to known measurements listed in manufacturer's literature.

- Weigh the shot wad.

- Microscopic examination may reveal striations suitable for comparison.

- Microscopic examination may reveal manufacturer's data stamped into the wad.

- If evidence shotshells are submitted, it may be necessary to disassemble one for the determination of gauge size or similarity of manufacture.

15.8.2 Shot Pellet Size Determination

- 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 examination or if such an examination is necessary. If determined that forensic biology or fingerprint examination is necessary, transfer the evidence to that unit prior to examining.

- Document the evidence contained within the packaging.

- Record the total number of pellets received and note the pellet composition. Individual shot pellets can be a collective exhibit and do not require a unique exhibit number.

- Determine the number of pellets suitable for comparison purposes. Make note if pellets all appear to be similar in size. If several different sizes are present, determine each specific size. Any pellet with significant damage or loss of mass should not be included in size determination, but should be documented.

- Check the calibration of the balance according to the procedure described in the Performance Checks and Maintenance Appendix 7. All results shall be recorded in the firearm examiner's notes.

- Weigh the pellets in grains. This may be done collectively or individually by following Step A or B below:

  A. If the pellets all appear to be approximately the same size and composition, with little or no apparent damage or loss of mass, the pellets may be weighed collectively. This weight will then be divided by the number of pellets weighed to determine the average individual pellet weight: or,

  B. Weigh the pellets individually and take an average of these measurements.

  C. The calculations should be included with the documentation. These calculations should be checked during verification/technical review.

- Check the calibration of the calipers or digital micrometer according to the methods detailed in the Performance Checks and Maintenance Appendix 7. All results shall be recorded in the firearm examiner's notes.

- Choose the best specimens and measure the diameter of the shot pellets using a caliper or digital micrometer. The diameter should be recorded to thousandths of an inch.

- To determine the shot size, compare the average pellet weight and diameter of the evidence pellets to known pellet sizes in Table 1 of Appendix G of the AFTE Glossary.

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

15.10 Interpretations of Results:

15.10.1 Shot size is written as a numerical term.

15.11 Report Writing: Most ammunition component 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.

15.12 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, 5th 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.

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

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.