4.0 Physical Examination & Classification of Fired Shotshell Evidence

4.1 Introduction

The initial examination of any evidence shotshell cases will include the completion of a worksheet in Forensic Advantage. These worksheets will include the physical description of the shotshell case and will serve as a source to document the condition of the evidence as received and any tests or comparisons performed.

By examining wadding, the examiner may be able to determine the gauge size, manufacturer, and if the wad contains markings suitable for comparison with the firearm that fired it.

By examining recovered shot pellets, the examiner may be able to determine the actual shot size. The determined size can then be compared to the shot size loaded in submitted shotshells or to the size that the submitted shotshell case was marked to have contained.

4.2 Safety Considerations

Examinations performed in the Firearm and Toolmark Section are inherently hazardous. These procedures involve hazardous chemicals, firearms, ammunition, and power tools. All hazardous procedures must be performed in compliance with the Laboratory Operations Manual and the Health and Safety Manual.

4.3 Preparation of Cleaning Solution

4.3.1 Bleach Solution

- Prepare a Bleach Solution as needed by combining 10 milliliters of bleach to 90 milliliters of distilled water
- Discard after use
  Other cleaning solutions may be used

4.4 Instrumentation

- Comparison Microscope
- Stereo Microscope
- Micrometer/Caliper
- Scale/Balance

4.5 Minimum Analytical Standards and Controls

Appendix A Calibration Standards

4.6 Procedure or Analysis

The evidence will be marked in accordance with the Laboratory Operations Manual Section 4.3. A systematic approach should be used for the physical examination and classification of fired shotshell cases, with recording of findings and observations in the notes.

Items that have been processed by the MSP Biology Units are typically given item numbers/identifiers that contain the lab number and subsequent identifier unique to that item. For ease of documentation and review, all firearms personnel may omit the preceding lab number and use the subsequent unique identifier. The preceding lab number of an item shall not be omitted if doing so creates a duplicate item number. If the preceding lab number is omitted from items in the results section of the lab report, a notation should be made at the end of the report stating as much.

4.6.1 Shotshell Cases

Examination of shotshell cases should include general, visual, physical, and trace examinations, gauge determination, and marks determination.

4.6.2 General, Visual, Physical, and Trace Examination

The initial examination of any shotshell case will include a worksheet. The evidence will be marked in accordance with the Laboratory Operations Manual.

Examine the shotshell case visually and microscopically for any material. Determine if further examination of the material is necessary and consult the appropriate section prior to the removal of any trace evidence. Document findings and observations and record in notes.

Once the shotshell case has been examined for the presence of pertinent material, visual and physical examinations are conducted to determine the following features, to be documented on the worksheet or notes:

- Presence or absence of trace material
- Gauge
- Possible manufacturer/marketer of the shotshell case (Forensic Ammunition Service Centerfire Headstamp Guide 2010 Version, CartWinPro 3.5)
- Ignition system - centerfire
- Description of metal (color and material) used in hull and primer
- Description of headstamp/information printed on hull

4.6.3 Trace Material Examination

Evidence recovered during an investigation may contain trace material transferred from the crime scene. This material may be in the form of blood, tissue, plaster, paint, hairs, fibers, glass, etc. Removal and/or preservation of this material may be necessary to allow a complete examination of the evidence.

4.6.4 Shotshell Case Gauge Determination

Gauge can usually be determined by examination of the headstamp of the shotshell case. If it is not legible on the headstamp, the shotshell case can be compared with laboratory references, including but not limited to the reference ammunition file, reference literature and ammunition databases.

4.6.5 Wads

Examination of wads should include general, visual, physical, and trace examinations, gauge determination, and marks determination.

4.6.6 Wad Gauge Determination

Gauge can usually be determined by measuring the diameter of the wad and comparing with laboratory references, including but not limited to reference ammunition collection, reference literature and ammunition databases.

4.6.7 Pellets

4.6.7.1 Classification by Weight

- The shot size/shot number can be determined by comparing measured weight with the known pellet weights in NRA Fact book, Tables 1 or 2 Section 13- Appendices of the AFTE Glossary, 6th ed., manufacturer's data or laboratory references, including but not limited to the reference ammunition collection, reference literature and ammunition databases.
- Record findings and observations in notes/worksheet

4.6.7.2 Measuring Pellet Size

- The shot size/shot number can be determined by comparing the measured diameter using a micrometer/caliper in thousandths of an inch with known pellet size references such as the NRA Fact book, Tables 1 or 2 of Section 13- Appendices of the AFTE Glossary, 6th ed., manufacturer data or laboratory references, including but not limited to the reference ammunition collection, reference literature and ammunition databases.
- Record findings and observations in notes/worksheet

4.6.8 Examination of Marks

Visual and microscopic marks are imparted on ammunition components during discharge. An examination and comparison of the class and microscopic characteristics is necessary for a possible determination of origin.

4.6.9 Interpretation of Results

- May determine gauge and brand/manufacturer/marketer of shotshell
- May determine type and size of shot
- May determine type of slug or sabot
- May determine type of wadding or shot cup (if present)
- May determine if there are suitable markings for identification with a firearm or with other fired components
- Record interpretation of results in the notes

4.7 Appendices

Appendix A - Calibration Standards

4.8 References

Association of Firearm and Toolmark Examiners Glossary, 6th ed. 2017, Section 13- Appendices, Tables 1 thru 7

Howe, Walter J. "Laboratory Work Sheets" AFTE NEWSLETTER NUMBER TWO August 1969, p. 13
NRA Firearms Fact Book