



Standard Practice for the Collection and Preservation of Organic Gunshot Residue (OGSR)¹

This standard is issued under the fixed designation E3307; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for the sampling and preservation of organic gunshot residues (OGSR) recovered from hands, skin, clothing, and other surfaces.

1.2 This practice is intended for use by competent forensic science practitioners with the requisite formal education, discipline-specific training (refer to Practice E2917), and demonstrated proficiency to perform forensic casework.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

E1188 Practice for Collection and Preservation of Information and Physical Items by a Technical Investigator

E1492 Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory

E1588 Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry

E1732 Terminology Relating to Forensic Science

E2917 Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E3196 Terminology Relating to the Examination of Explosives

E3391 Terminology Relating to Gunshot Residue Analysis (GSR)

3. Terminology

3.1 *Definitions*—For definitions of terms that can assist in interpreting this practice, refer to Terminologies E1732, E3196, and E3391.

4. Summary of Practice

4.1 Organic gunshot residues are found on exposed surfaces in the vicinity of a firearm discharge. These residues can be collected and subsequently analyzed for the presence of residues related to OGSR. This practice describes procedures for the collection of OGSR from various surfaces in the field or in the laboratory; and the preservation of the collected samples.

5. Significance and Use

5.1 This practice provides best practices to be followed in the collection and preservation of OGSR samples intended for forensic analysis.

5.1.1 This practice applies to the collection of OGSR from surfaces in both field and laboratory settings.

5.1.2 Adhesive tape lifting is suitable for collecting OGSR from many dry surfaces, including skin, hair, and clothing (1-4).³

5.1.2.1 Other OGSR collection techniques such as swabbing, and vacuuming have been reported but they are not recommended for routine practice.

5.2 Gunshot residue (GSR) examinations are commonly performed to determine if an individual could have been exposed to firearm discharge. Traditional GSR analysis has relied upon the detection of pGSR, as described in Practice E1588; however, OGSR provides information that complements pGSR analysis (1, 5). This standard practice is of use to forensic laboratories desiring to supplement pGSR analysis with OGSR analysis to identify surfaces exposed to gunshot residue.

³ The boldface numbers in parentheses refer to a list of references at the end of this standard.

5.3 OGSR originates from the combustion of the smokeless powder and the priming mixture following their ignition during the firearm discharge process. After a firearm has been discharged, the combined residue can be found on exposed surfaces in the vicinity of the fired weapon (for example, hands, other exposed skin surfaces, hair, clothing) (2, 5). OGSR can also be found in the cartridge case after firing and can be recovered to provide information about the constituents of the propellant or the priming mixture, or both.

5.4 This standard practice does not apply to the analysis or interpretation of OGSR, or pGSR.

6. Materials

6.1 Sample Collection Device:

6.1.1 Use aluminum stubs with double-sided carbon adhesive tapes used for GSR analysis by SEM-EDS as described in Practice E1588.

6.2 Sample Storage Containers:

6.2.1 Use airtight stub holders to reduce sample loss due to evaporation.

7. Procedure

7.1 Refer to Practices E1188 and E1492 for general procedures for handling evidence and documentation.

7.2 General Requirements to Follow Prior to each Sample Collection:

7.2.1 Use a large format paper, such as butcher paper, as a clean working area.

7.2.2 Store sample collection devices in closed containers to prevent contamination prior to sampling.

7.2.3 Wash hands thoroughly, wear Personal Protective Equipment (PPE) such as overalls, and single use gloves.

7.2.4 To prevent secondary transfer, collection shall be performed only by individuals that have not handled a firearm within 4 hours prior to a collection (1).

7.3 Sample Collection:

7.3.1 Use a separate sample collection device for each surface (for example, each hand or shirt sleeve is sampled separately).

7.3.2 Dab the adhesive side of the sampling device onto the surface to be sampled until tackiness is lost (30 to 50 dabbings) to achieve maximum collection efficiency.

7.3.3 Place each sampling device in a separate labeled storage container to reduce possible sample loss due to evaporation.

7.3.4 Seal the sample storage container and record collection information on the label.

7.4 Sample Preservation:

7.4.1 Store collected samples at 4 °C or lower as soon as possible to maximize preservation of OGSR related compounds.

8. Documentation

8.1 Obtain and retain the hardcopies or electronic format, or both, of the following documents:

8.1.1 Chain of custody during the collection and preservation of OGSR.

8.1.2 Field notes from the collection of OGSR, including but not limited to, the materials used for collection, location and type of the surface(s) sampled (for example, skin, shirt, glass), time elapsed between shooting incident and sample collection, field blanks, and the storage procedure employed immediately after collection.

8.1.3 Laboratory notes about the handling of the OGSR samples, including but not limited to, how the samples were stored upon arrival at the laboratory, type of sample collection device, and duration of storage of the samples prior to analysis.

8.1.3.1 Record all known or possible storage condition errors or improper storage conditions that could compromise the sample (that is, failure to store in an airtight container, failure to store at proper temperature).

8.1.3.2 Record all exceptions to these procedures and reasons or justifications for departures from this practice.

9. Keywords

9.1 collection; forensic science; OGSR; organic gunshot residue; preservation

REFERENCES

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