

Battery Examinations

1 Scope

These procedures describe the process for battery examinations and apply to explosives and hazardous devices caseworking personnel who examine batteries and their post-blast remains to determine identifying and functionality information.

2 Introduction

Batteries are items designed to establish a potential difference in a circuit, thereby creating an electric field. The electric field exerts forces on the electrons in the circuit, causing them to move, resulting in a current. Because the potential difference at the battery terminals is constant in a particular circuit, the resultant current is also constant in magnitude and direction and is therefore referred to as direct current (DC).

Batteries are often utilized in the fabrication of electrical fuzing (i.e., initiating), systems for improvised explosive devices (IEDs). The fuzing system often consists of wiring and switching mechanisms designed to provide current to an initiator, whose explosion in turn initiates the main charge explosive. When subjected to the forces of an explosion, batteries can be fragmented into their components. Through an examination of a battery, or its fragmented remains, its functionality within the IED and manufacturing information can sometimes be determined. This data can provide the investigator lead information which can facilitate the identification of the subject(s) and/or group responsible for constructing the device.

3 Equipment/Materials/Reagents

Below is a list of items that can be used to examine batteries and their post-blast remains. Explosive and hazardous devices personnel should choose the most appropriate items based on the nature of the evidence.

- Personal Protective Equipment (e.g., lab coat, eye protection, gloves)
- Hand tools (e.g., tweezers, pliers, utility knife)
- Cleaning materials and disinfectants (e.g., cloths, bleach, rubbing alcohol)
- Stereomicroscope (various magnifications)
- Ruler (e.g., standard 12 inch length)
- Micrometer
- Caliper
- Multimeter
- FBI Laboratory Explosives Reference Tool (EXPeRT) Database
- Reference texts, manuals, manufacturers' literature, and known materials are maintained in the Explosives library. Additional reference information can be obtained from direct contact with manufacturers and distributors.

4 Standards and Controls

Not applicable.

5 Sampling or Sample Selection

Not applicable.

6 Procedures

These procedures are implemented as part of the overall examination process outlined in the Device Examinations Standard Operating Procedure (SOP). Refer to the Safety section of this SOP before starting any examinations.

Explosives and hazardous devices personnel will:

6.1 Before any examinations are conducted ensure that the item(s), as well as its container(s) and packaging, have been appropriately marked in accordance with the FBI *Laboratory Operations Manual (LOM)* (i.e., item number, initials, and full Laboratory number, where practicable).

6.2 Ensure care is taken not to obliterate any identifying marks which have been previously placed on the item or obliterate any microscopic marks of value.

6.3 Visually examine the item(s) for any trace evidence that could be of value. This evidence could include, but not be limited to the following: hairs, fibers, blood, paint, or other particles.

6.3.1 If trace evidence is to be examined or preserved, contact the appropriate unit and determine if the material should be removed. Record the material by means of notes, sketches, or photographs before it is removed.

6.4 Note the physical characteristics of the battery through visual/microscopic examination. Physical measurements should also be recorded to aid in determining as many of the following attributes as possible:

- Manufacturer
- Brand
- Type
- Date of Manufacture
- Special properties (e.g., physical condition, functionality, modifications made for use in IED)

6.5 If possible, determine the manufacturer, brand, and type by searching the EXPeRT

database, Explosives reference files, manufacturers' literature, and/or reference or known materials collection. Identifications are made by comparison of observable and measurable physical characteristics with those provided in the above reference/literature materials.

7 Calculations

Not applicable.

8 Measurement Uncertainty

Not applicable.

9 Limitations

Refer to the Limitations section in the Device Examinations SOP and Appendix B of the Explosives and Hazardous Devices Report Writing Guidelines SOP.

10 Safety

Safety protocols, contained within the FBI Laboratory Safety Manual, will be observed at all times.

10.1 Batteries may explode or leak and cause injury if recharged or placed in/near a source of high heat. Batteries which are not new or have been fragmented, are subject to corrosion, which can adversely affect the battery and other items stored with them. As such the following guidance is provided:

10.1.1 Batteries and their fragments will be packaged separately from other materials.

10.1.2 Batteries will not be examined at the same time as explosives which can be initiated with electrical energy or static discharge.

10.1.3 Protective gloves (e.g., latex, nitrile) must be worn when handling batteries or battery components that have corroded or that have been possibly exposed to blood, tissue, or other bodily fluids. Gloves will prevent exposure of personnel to possible hazardous material on the items and prevent DNA from being transferred to the items.

10.2 Batteries potentially containing blood or other body fluids will be cleaned in 2.5% bleach solution or other suitable disinfectant following discussions with personnel that may conduct other examinations of the batteries.

11 References

FBI Laboratory Division

FBI Laboratory Quality Assurance Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

FBI Laboratory Operations Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

Explosive Devices SOPs, Federal Bureau of Investigation, Laboratory Division, latest revisions.

Other

Federal Bureau of Investigation, Batteries and Their Internal Components, General Information Bulletin 78-6, FBI Bomb Data Center, 1978

Mimms, F.M., Getting Started in Electronics, Master Publishing Inc., 2000

Thurman, J.T., Practical Bomb Scene Investigation, 2nd Edition, CRC Press, 2011

Rev. #	Issue Date	History
0	07/07/2006	Original Issue to follow QATU formatting and ASCLD/LAB-International requirements
1	10/02/2017	Administrative changes for grammar, clarity, and conformance to revised QAM and LOM. Removed references to the Explosives Unit to applicability to those conducting explosives and hazardous devices related examinations. Deleted Calibration section since it is not required. Updated Limitations section to refer the reader to the Device Examination SOP and Appendix B of the Explosives and Hazardous Devices Report Writing Guidelines SOP. Updated references.

Redacted - Signatures on File

Approval

Explosives Unit Chief

Date: 10/02/2017

TL Approval

Explosives and Hazardous
Devices Technical Leader

Date: 10/02/2017

QA Approval

Quality Manager

Date: 10/02/2017