Battery Examinations

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1 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, sometimes referred to as the electron 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 referred to as direct current (DC).

Batteries are often used in the fabrication of electrical fuzing systems, also referred to as initiating systems, for improvised explosive devices (IEDs) or improvised incendiary devices (IIDs), collectively referred to hereafter as devices. The fuzing system often consists of wiring and electronic components designed to provide current to an initiator, the explosion of which initiates the energetic material used as the main charge in the device. When subjected to the forces of an explosion, batteries can be severely damaged and fragmented into their components. Through the examination of the fragmented or charred remains of a battery, its functionality within the device and manufacturing information can sometimes be determined. This information can assist the investigator in identifying the subject(s) responsible for constructing the device.

2 SCOPE

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

3 EQUIPMENT

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 PROCEDURE

These procedures are implemented as part of the overall examination process outlined in the Explosives and Hazardous Devices Examinations Standard Technical Procedure (TP). Refer to the Safety section of this TP before starting any examinations.

Explosives and hazardous devices personnel will:

A. 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).
B. 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.
C. Visually examine the item(s) for 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.
D. 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.
E. 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
    - Country of manufacture
    - Date of manufacture
    - Brand
    - Type
    - Special properties (e.g., physical condition, functionality, modifications made for use in device)
F. 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.

5 LIMITATIONS

Refer to the Limitations section in the Explosives and Hazardous Devices Examinations TP and Appendix A of the Explosives and Hazardous Devices Report Writing Guidelines.

6 SAFETY

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

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:

A. Protective gloves (e.g., latex, nitrile) should be worn when handling evidence.
B. Batteries will not be examined at the same time as explosives which can be initiated with electrical energy or static discharge.
C. Batteries and their fragments will be packaged separately from other materials.
D. Items containing blood or other body fluids can be cleaned with a bleach-based solution or other suitable disinfectant following discussions with personnel that may conduct other examinations of the items.

7 REVISION HISTORY

Revision	Issued	Changes
02	06/15/2022	Updated to new document template and updates made throughout for clarity.