

Fuzing System Examinations

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1 INTRODUCTION

Improvised explosive devices (IEDs) and improvised incendiary devices, collectively referred to hereafter as devices, are normally constructed with a main charge and a fuzing system, also referred to as an initiating system. A fuzing system is a method used to transfer energy from a power source (e.g., a flame from a match, a battery) to an initiator or main charge. A non-electrical fuzing system generally consists of components designed to transmit thermal energy to an initiator that functions the main charge (e.g., a piece of hobby fuse connected to a non-electric detonator inserted into a main charge). An electrical fuzing system generally consists of electrical components designed to provide the current from a power source (e.g., a battery) to an initiator that functions the main charge. Typically, the fuzing system is fabricated to work only once. Numerous components can be used in the design of fuzing systems, such as, but not limited to, pyrotechnic fuse, rags, cigarettes, wire, batteries, battery holders, tape, solder, switches, timers, circuit boards, clocks, watches, integrated circuits, connectors, and radio control (RC) systems. Information obtained from the examination of fuzing systems can assist the investigator in identifying the subject(s) responsible for constructing the device.

2 SCOPE

These procedures describe the process for fuzing system examinations and apply to explosives and hazardous devices personnel who examine these systems 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 fuzing systems and their post-blast remains. Explosives 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
- X-ray machine
- Pillboxes, glass containers, and static-proof plastic bags
- 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 Technical Procedure (TP). Refer to the Safety section of this TP before starting any examinations.

Fuzing systems should be examined for the presence of explosive or incendiary components before a detailed examination is conducted. Should such components be found, they should be removed and placed into appropriate explosives storage containers.

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, when practicable).
- B. Ensure care is taken not to dislodge any trace evidence, obliterate any identifying marks which have been previously placed on the item(s), or obliterate any microscopic marks of value.
- C. Visually examine the item(s) for any trace evidence that could be of value. This evidence could include, but not limited to the following: hairs, fibers, blood, paint, or other particles.
 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.
- D. Take appropriate photographs of the fuzing system before disassembling it for examination purposes.
- E. Note the physical characteristics of the fuzing system and its components through visual/microscopic examination. Physical measurements should be taken to aid in determining as many of the following attributes as possible:
 - o Construction characteristics
 - o Manufacturer
 - o Brand
 - o Type
 - o Special properties (how utilized in device, how components were assembled, alterations, exploded, etc.)
- F. If possible, determine the manufacturer, brand, and type by searching EXPeRT, data base, explosive reference files, manufacturers' literature, and/or reference or known materials collection. Identifications or associations are made by comparison of observable/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.

- A. Protective gloves (e.g., latex, nitrile) should be worn when handling evidence.
- B. Various components normally associated with fuzing systems can explode, leak, contain sharp edges, and/or constitute an incendiary or electrical hazard. As such, the following guidance is provided:
 - 1. Electrical fuzing systems will not be examined at the same time as other components that can be initiated by electrical energy or static discharge.
 - 2. Non-electrical fuzing systems will not be examined at the same time as other components that can be initiated by thermal energy.
- C. 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	Changed title to Fuzing System Examinations. Updated to new document template and updates made throughout for clarity.