

Non-Electric Detonator Examinations

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Non-Electric Detonator Examinations

1 INTRODUCTION

A non-electric detonator, also referred to as a blasting cap or fuse cap, is a small explosive component whose general purpose is to initiate a detonator-sensitive energetic material (EM) into which it is inserted. Non-electric detonators generally consist of a metal shell loaded with sensitive EMs pressed into the bottom of the shell. One end of the shell is open for the introduction of safety fuse or detonating cord. Proper initiation of the safety fuse causes a spit of flame from the end of the fuse to initiate the EM in the detonator. Proper initiation of the detonating cord causes the shock wave from the cord to initiate the EM in the detonator.

Non-electric detonators are generally used in commercial blasting operations to initiate larger quantities of detonator-sensitive EMs. Non-electric detonators can also be used in the fabrication of improvised explosive devices (IEDs) to initiate other EMs or they can be used as the only explosive component within a device. Depending on the amount of EM into which the detonator is inserted and its exact use within the IED, it may be possible to recover detonator fragments in a post-blast environment. Through an examination of the detonator, or its fragmented remains, 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 non-electric detonator examinations and apply to explosives and hazardous devices personnel who examine non-electric detonators 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 non-electric detonators 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, full face shield, gloves)
- Hand tools (e.g., tweezers, pliers, cutters, wire strippers, utility knife)
- Cleaning materials and disinfectants (e.g., cloths, bleach, rubbing alcohol)
- Stereomicroscope (various magnifications)
- Ruler (e.g., standard 12-inch length)
- Micrometer
- Caliper
- X-ray machine
- Detonator inerting machine
- Pillboxes, glass containers, 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.

Explosives and hazardous devices personnel will:

- A. Before any examinations are conducted, ensure that the items, as well as their containers and packaging, have been appropriately marked in accordance with the FBI Laboratory Operations Manual (LOM) (i.e., item number, initials, and Laboratory number, when practicable).
- B. Take precautions to not obliterate any identifying marks on the detonator or obliterate any microscopic marks of value. Record the presence of such marks through notes and sketches.
- C. Take photographs of the items to aid documentation and device reconstruction.
- D. Visually examine the detonator for evidence such as fingerprints, hairs, fibers, blood, paint, or other particles.
 1. If evidence is to be examined or preserved, contact the appropriate unit and determine if the material should be removed. Record the presence of the material by means of notes, sketches, or photographs before it is removed.
- E. Note the physical characteristics of the detonator 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 Country of manufacture
 - o Brand
 - o Type
 - o EM present
 - o Special properties (e.g., physical condition, functionality, modifications)
- F. If possible, determine the manufacturer, brand, and type by searching the EXPeRT data base, unit reference materials, manufacturers' literature, or other reference materials. Identifications or associations are made by comparison of observable/measurable physical characteristics with those provided in reference 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. Detonators containing EMs should be protected from sources of heat, impact, shock, and friction. Should they be initiated accidentally, they have the capability of inflicting personal injury and property damage; therefore, they should be handled with care. Personnel should follow the below guidance regarding the handling of non-electric detonators:
1. Detonators should be stored in approved, explosion-proof containers (e.g., MK663 containers, explosive magazine) when not under examination.
 2. Detonators will be shipped in Department of Transportation (DOT) approved containers (e.g., MK663 containers).
 3. Detonators will be rendered safe, or inert, by using available, specialized equipment (e.g., detonator inerting machine). Inert detonators should be marked as such.
 4. Appropriate facial protection (e.g., eye protection, full face shield) should be worn when handling live detonators.
 5. Detonators and other types of EMs and components should not be examined at the same time or placed close to each other.
- 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	08/15/2022	Updated to new document template and updates made throughout for clarity.