

Safety Fuse Examinations

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Safety Fuse Examinations

1 INTRODUCTION

Safety fuse, also known as time fuse, is a commercially available explosive component that is used in commercial blasting operations to initiate a non-electric detonator. It is manufactured as a cord that generally consists of a plastic sheath containing a center core of energetic material (EM), usually the low-explosive black powder, enclosed in textiles and waterproofing materials. Safety fuse is initiated with a flame at one end to transmit a burning reaction through the length of the explosive core, thereby producing an intense spit of flame from the other end that initiates the detonator. The burning reaction travels at a constant rate, hence different lengths of safety fuse provide different time delays.

Safety fuse can be used in improvised explosive devices (IEDs) and improvised incendiary devices (IIDs), hereafter referred to as devices, to initiate a non-electric detonator or to directly initiate a low explosive. Depending on its exact use in a device, it may be possible to recover post-use fragments. Examination of safety fuse, or its fragmented remains, can sometimes assist in determining its functionality within a device and provide manufacturing information. This information can assist the investigator in identifying the subject(s) responsible for constructing the device.

2 SCOPE

These procedures describe the process for safety fuse examinations and apply to explosives and hazardous devices personnel who examine it and its post-use remains to determine identifying and functionality information.

3 EQUIPMENT

Below is a list of items that can be used to examine safety fuse and its post-use 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, face shield, 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., 12-inch length)
- Micrometer
- Caliper
- Containers (e.g., boxes, pillboxes, glass/plastic/metal containers, plastic/paper bags, static-proof/dissipative plastic bags)
- FBI Laboratory Explosives Reference Tool (EXPeRT) database
- Reference texts, manuals, manufacturers' literature, and reference items 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. Ensure that all evidentiary items, their containers, and packaging have been marked in accordance with the [FBI Laboratory Operations Manual \(LOM\)](#) (i.e., item number, initials, and Laboratory Number, when practicable) before beginning examinations.
- B. Take precautions to not obliterate any marks of value on the items. Record the presence of such marks through notes, sketches, and photographs.
- C. Take photographs of the items prior to disassembly to aid documentation and device reconstruction.
- D. Visually examine the items 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 removal.
- E. Note the physical characteristics of the items through visual/microscopic examinations. 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 Special properties (e.g., physical condition, functionality, modifications)
- F. Attempt to determine identifying information by searching the EXPeRT database, reference materials, and manufacturers' literature. Identifications and associations are made by comparison of observable and measurable physical characteristics with those provided in the above reference materials.

5 LIMITATIONS

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

6 SAFETY

Safety protocols outlined in the [FBI Laboratory Safety Manual](#) will be observed.

- A. Protective gloves (e.g., latex, nitrile, etc.,) will be worn when handling evidence.
 1. Appropriate gloves should be worn for protection against the sharp edges associated with the fragmented remains of some items.
- B. Items containing EMs should be protected from sources of heat, impact, shock, friction, and electrostatic discharge (ESD). Should they be accidentally initiated, they

- have the capability of inflicting personal injury or property damage and should be handled with care.
- C. Items containing EMs will be stored in approved, explosion-proof containers (e.g., explosives magazines, MK663 containers, as appropriate) when not being examined.
 - D. Safety fuse containing more than five (5) grams of EM will not be accepted for examination in the Laboratory.
 - 1. Extra EM with a mass of greater than five (5) grams will be properly stored in approved, explosion-proof containers (e.g., explosives magazines, MK663 containers, as appropriate).
 - 2. Examinations of safety fuse containing more than five (5) grams of EM will be conducted at an appropriate, remote location such as an explosives demolition range.
 - E. Items containing EMs will be shipped in approved containers, as appropriate.
 - F. Facial protection will be worn when handling items containing EMs, as appropriate.
 - G. An item containing EMs will not be examined at the same time as, or placed close to, other EMs or other explosives-related components.
 - H. Refer to the Non-Electric Detonators Examinations TPs if a detonator is submitted with safety fuse.
 - I. 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	09/15/2022	Updated to new document template and updates made throughout for clarity.