



## **Investigation Guideline**

### **Product: Smoke Alarms, Fire Sprinklers, and Fire Extinguishers**

**Appendix #: 129**

**Date: September 2004**

### **I. Introduction**

Use this guideline as an adjunct to an investigation of any fire, regardless of size, in which any of these products are present in the household. If *none* of these products were present, or if it is *unknown* if they were present, a statement in the investigation stating their absence is sufficient and the Data Record Sheet on page 4 of this guideline, does *not* need to be completed. Even if the fire is too small to expect operation of a smoke alarm or sprinkler, a fire extinguisher may be appropriate and its use would be of interest. This guideline is limited to the description and role of these products during the fire. It assumes that information on fire cause will be included as a result of the original assignment and normal investigative procedures and reporting should be followed.

### **A. Background Information**

Smoke alarms (also called smoke detectors when in residential occupancies), fire sprinklers, and fire extinguishers are thought to be effective fire safety devices capable of preventing fire deaths and injuries. Their effectiveness, however, can be evaluated only when it is possible to evaluate their performance in a fire. As a result, we need to obtain information about them from fires that originated in other sources.

### **B. Product Descriptions**

#### Smoke alarms:

Power source: 1) battery only, 2) direct connection to the electrical distribution system (hard-wired), or 3) hard-wired with a battery backup.

Type: 1) photoelectric, 2) ionization (will have a label somewhere including a radioactive symbol), or 3) a combination of the two.

Safety Standard: UL 217 Single and Multiple Station Smoke Alarms

#### Fire Sprinklers:

##### Type:

- 1) Wet pipe- contains water at all times, installed only where pipes will not freeze. Most residential sprinklers are of this type.
- 2) Dry pipe – mostly non-residential, water fills pipes only as needed

- 3) Preaction- operates only after being activated by a separate sensing device such as a smoke alarm. Mostly used in locations where accidental discharge is of special concern, e.g. a computer room.

Safety Standard: NFPA 13: Installation of Sprinkler Systems

NFPA 25: Inspection, Testing and Maintenance of Water-Based Fire Protection Systems

UL 199, Automatic Sprinklers for Fire Protection Service

UL 1626, Residential Sprinklers for Fire Service Protection

#### Fire Extinguishers:

Rating: Fire extinguishers are rated and labeled for the type of fire in which they are effective.

Class A – for fires involving wood, paper, plastics, and ordinary combustibles

Class B – for fires involving flammable liquids

Class C – for fires involving energized electrical equipment

Some extinguishers are appropriate for multiple uses.

Extinguishers need to be kept charged, which can usually be determined by a gauge incorporated into the top assembly.

Safety Standard: NFPA 10, Portable Fire Extinguishers

UL 711, Fire Testing of Portable Fire Extinguishers

### **C. Specific Items of Interest**

Smoke Alarms: The smoke alarm's only purpose is to provide early warning of the fire.

- 1) Did a smoke alarm contribute to the occupant's recognition that there was a fire?
- 2) If not, did smoke reach one of the alarms soon enough that it should have sounded?
- 3) If it did not sound when it should have, did the alarm power at the time? If not, why not?
- 4) For all occupants who were asleep when the alarm sounded, indicate their ages and whether they were awakened by the alarm. Also indicate their location in relationship to the nearest smoke alarm sounding and any circumstances, such as a closed door, that would have reduced the sound heard by the occupant.
- 5) Indicate number and placement of alarms in the household, in relation to coverage of each floor and each bedroom, particularly the room of origin.

#### Fire Sprinklers:

- 1) Did the room of origin have sprinkler heads? If so, did they operate?
- 2) Did the fire extend to other rooms?
- 3) Was the water to the system turned on? If not, why not?
- 4) If the system did not operate when it should have, specify its age, manufacturer(s), model, and type of system

Fire Extinguishers:

- 1) Was the extinguisher effective in containing the fire? If not, describe what happened when the extinguisher was used.
- 2) Was the extinguisher in operable condition?
- 3) Did the occupant know how to use it?
- 4) How many extinguishers did the occupant use/try to use?

**D. Headquarters Contacts**

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**II. Instructions for Collecting Specific Information**

**A. Synopsis**

Indicate the presence/absence of each of these products and their role in containing the fire or contributing to its recognition.

**B. Description of Incident Environment**

Include a description of whether these products were present in the household. If so, describe their locations in relation to the fire origin. If a closed door prevented smoke from reaching a nearby alarm, it should be indicated.

**C. Description of Interaction between Injured Person(s) and Product**

For fire extinguishers, describe any problems that the occupant had in using the extinguisher. Describe any problems with smoke alarms or fire sprinklers that may have affected operational status at the time of the fire.

**D. Description of Product**

Describe brand name, age, condition, etc. on any product that failed to operate properly.

**III. Photographs/ Diagrams of Incident Scene**

Include diagrams as needed to convey the locations of the products involved in relation to fire origin. Photographs may be particularly useful to convey the condition and characteristics of the products involved.

**IV. Obtaining samples and documents related to the investigation**

No samples are required.

**DATA RECORD SHEET**  
**Investigation Guideline**

**PRODUCT: Smoke Alarms, Fire Sprinklers, and Fire Extinguishers**  
**To be used as a supplement to investigations of all residential fires, regardless of size, where one or more of these products was present.**

**TASK NUMBER** \_\_\_\_\_ **INCIDENT DATE** \_\_\_\_\_

**A. Smoke Alarms (Detectors):**

1. Were there any smoke alarms present in this occupancy?

- Yes, continue
- No, SKIP to section B
- Unknown, SKIP to section B

2. Did a smoke alarm sound during the fire?

- Yes → **Did the alarm contribute to initial recognition of the fire?**
  - Yes
  - No
  - Unknown
- No → SKIP to Question A. 4
- Unknown SKIP to Section B

3. **For each occupant who was asleep when the alarm sounded**, list the age of that person and whether he/she was awakened by the alarm.

Age	Awakened by Smoke Alarm (enter yes, no, unknown)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

If the alarm **nearest the fire origin** sounded during the fire, skip to Section B.

4. Did enough smoke reach the alarm **nearest to the fire origin** that the occupant thought it should have sounded during the fire?

- Yes
- No SKIP to Section B
- Unknown SKIP to Section B

5. Was the alarm nearest to the fire origin powered at the time of the fire?  
 Yes SKIP to Question A.7  
 No  
 Unknown SKIP to Question A7
6. What was the condition that resulted in lack of power?  
 No battery  
 Battery dead,  
 Battery present but disconnected  
 Alarm disconnected from electrical system (120 VAC)  
 Electrical system inoperable,  
 Other, describe \_\_\_\_\_
7. Did the occupant have any problems with this alarm?  
 Yes, describe \_\_\_\_\_  
 No  
 Unknown
8. What are the characteristics of the alarm nearest the fire origin?
- a. Type:  
 Ionization (radioactive symbol)  
 Photoelectric  
 Combination  
 Unknown
- b. Power source:  
 Battery only  
 Connected to electrical system (120 VAC) – Skip to 8d.  
 Combination (120 VAC with battery back-up)  
 Unknown, SKIP to Question .8d
- c. If the alarm contained a battery, was it a lithium battery?  
 Yes  
 No  
 Unknown
- d. Manufacturer/Model: \_\_\_\_\_
- e. Approximate age: \_\_\_\_\_ years
- f. If there were multiple alarms in the occupancy, were they interconnected? (When one alarm sounds, they all sound. Ask the homeowner.)  
 Yes  
 No  
 Unknown

9. Additional comments: \_\_\_\_\_  
\_\_\_\_\_

**B. Fire Sprinklers**

1. Was there a fire sprinkler system in this occupancy?

- Yes, continue
- No, SKIP to Section C
- Unknown, SKIP to Section C

2. Did the room of origin have sprinkler heads installed?

- Yes
- No
- Unknown

3. Did the sprinkler system operate during the fire?

- Yes
- No
- Unknown

4. Did flame damage extend outside the room of origin?

- Yes
- No
- Unknown

5. Was the water to the system turned on at the time of the fire?

- Yes
- No → Why not? \_\_\_\_\_
- Unknown

6. Sprinkler System Characteristics:

a) Type

- Wet Pipe
- Dry Pipe
- Preaction
- Other, describe \_\_\_\_\_
- Unknown

b) Age: \_\_\_\_\_ years

c) Manufacturer/Model \_\_\_\_\_

7. Additional comments: \_\_\_\_\_  
\_\_\_\_\_

### C. Fire Extinguishers

1. Was there a fire extinguisher in this occupancy?

Yes

No End of Data Record Sheet

Unknown End of Data Record Sheet

2. Did the occupant try to use a fire extinguisher to control the fire?

Yes → Describe degree of success

\_\_\_\_\_

No

Unknown

3. Fire Extinguisher Characteristics:

a) Rating

Class A

Class B

Class C

Combination., specify \_\_\_\_\_

Other, specify \_\_\_\_\_

Unknown

b) Age: \_\_\_\_\_ years

c) Manufacturer/Model \_\_\_\_\_

4. Describe any problems the occupant had in using the extinguisher

\_\_\_\_\_

\_\_\_\_\_

5. Additional comments: \_\_\_\_\_

\_\_\_\_\_