



Fire Protection Training

Procedures Handbook 4300

FIRE PROTECTION SYSTEMS

TOPIC: Types of Automatic Fire Detectors

TIME FRAME: 1 Hour

LEVEL OF INSTRUCTION:

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will list and describe the types of automatic fire detectors and identify the operation of each type.

Standard: With a minimum of 70% accuracy

MATERIALS NEEDED:

- Appropriate visual aids
- Audio visual equipment

REFERENCES:

- IFSTA, Industrial Fire Protection, 1st Edition, Chapter 8
- Fire Protection Handbook, NFPA, 16th Edition, Chapters 2 & 4

PREPARATION: The purpose of automatic fire detectors is to reduce fire losses involving life and property. Fire detectors if properly installed and maintained further this objective by providing occupants early notification of a fire in progress



Fire Protection Training

Procedures Handbook 4300

TYPES OF AUTOMATIC FIRE DETECTORS

PRESENTATION	APPLICATION
<p>I. TYPES OF AUTOMATIC FIRE DETECTORS</p> <p>A. Heat Sensitive Detectors</p> <p>1. Fixed temperature</p> <p>a. Sounds when detection element temperature reaches 135° F</p> <p>b. Thermostat causing activation is one of four types</p> <p>(1) Bimetallic strip thermostats</p> <p>(2) Snap action disc thermostats</p> <p>(3) Thermostatic cable</p> <p>(4) Fusible link and quartzoid bulb</p> <p>c. Thermostats are the most commonly used fixed temperature heating devices</p> <p>2. Rate of rise detectors</p> <p>a. Respond to an increase in heat at a rate greater than some predetermined value</p> <p>(1) Normally 12 - 15° F per minute</p> <p>b. Types</p> <p>(1) Pneumatic tube detectors</p> <p>(a) Activated by heat induced pressure rise</p> <p>(2) Thermoelectric detectors</p>	<p>Information sheet #1</p> <p>Information sheet #2</p>



Fire Protection Training

Procedures Handbook 4300

TYPES OF AUTOMATIC FIRE DETECTORS

PRESENTATION	APPLICATION
<ul style="list-style-type: none">(a) Increase in temperature causes increase in voltage(3) compensation devices(4) Combined rate of rise and fixed temperature	Information sheet #3
<p>B. SMOKE SENSITIVE DETECTORS</p> <ul style="list-style-type: none">1. Ionization<ul style="list-style-type: none">a. Small amount of radioactive material ionizes the air within the detector permitting current flow between electrodesb. Smoke particles attach to the ions reducing conductivity or current flow and sounds alarm2. Photoelectric<ul style="list-style-type: none">a. Light beam within room or detector causes alarm to sound if:<ul style="list-style-type: none">(1) Beam is deflected by smoke particles and strikes an off line receiver(2) Beam is obscured/weakened by smoke(3) Beam of light is interrupted	
<p>C. Gas Sensing Detectors</p> <ul style="list-style-type: none">1. Semi-conductors	



Fire Protection Training

Procedures Handbook 4300

TYPES OF AUTOMATIC FIRE DETECTORS

PRESENTATION	APPLICATION
<ul style="list-style-type: none">a. Oxidizing or reducing gases create electrical changes in the semi-conductor which activates alarm2. Catalytic<ul style="list-style-type: none">a. Catalyst within detector accelerates the oxidization of combustibleD. Flame Sensing Detectors<ul style="list-style-type: none">1. Operating principle<ul style="list-style-type: none">a. Responds to radiant energy visible to human eyeb. Respond to any source of flame based on intensity and spectral quality<ul style="list-style-type: none">(1) Glowing embers(2) Coals(3) Flames2. Types<ul style="list-style-type: none">a. Infraredb. Ultra violet	<p>Information sheet #5</p>



Fire Protection Training

Procedures Handbook 4300

TYPES OF AUTOMATIC FIRE DETECTORS

SUMMARY:

Automatic fire detectors are available which react to the main products of the combustion process, namely, heat, smoke, gas, and flames. Within each of these four categories are a variety of detectors which are distinguished primarily by the method of activation.

As a professional firefighter you may be called upon to by owners of smoke detectors to explain how they work or how they should be maintained.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).