Fire Safety

Overview

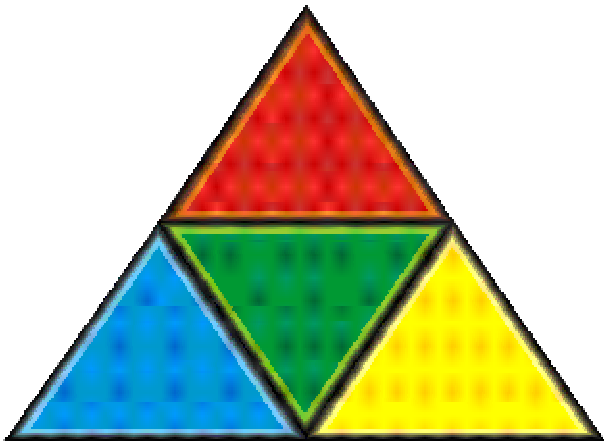
Introduction

Fires are one of the major hazards in the DLA workplace. Understanding the anatomy of a fire will assist you as a supervisor in identifying fire hazards. If a fire should occur, portable fire extinguishers can be a first line of defense. An understanding of the rules for portable fire extinguishers will arm you with information that may reduce the destructiveness of a fire.

Key Concepts

The fire tetrahedron

The fire tetrahedron illustrated below represents the elements required in the chain reaction that creates a fire.



Fuel is any solid, liquid, or gas that can burn.

Oxygen usually comes in the form of an oxidizing agent taken from the air.

Heat subjected to a fuel produces vapors that will combine with oxygen and burn.

The ***chain reaction*** takes place when all three elements are present. Removal of any element means a fire will go out or not occur.

If you don't report hazards, you're playing with fire!

Key Concepts, Continued

National Fire Protection Association (NFPA) Classes

NFPA divides fires into five different classes, A–D, and K. The table below provides a description of each class.

Class	Type	Example	Comment
ORDINARY A COMBUSTIBLES	Ordinary combustible material (Think: **Ashes**)	Wood, cloth, paper, rubber, and plastics	Water cools the fire. Dry chemicals retard combustion.
FLAMMABLE B LIQUIDS	Flammable or combustible liquids (Think: **Barrel**)	Tar, oil, greases, oil based paint, solvents, flammable gases	
ELECTRICAL C EQUIPMENT	Electrical (Think: **Circuits**)	Energized electrical equipment	Nonenergized electrical equipment fires are Class A or B.
COMBUSTIBLE D METALS	Combustible metals	Magnesium, sodium, and potassium	The extinguishing agent absorbs heat without reacting with the metal.
K	Cooking appliance that involves combustible cooking media	Stoves	

NFPA 704, Identification of Fire Hazards

The use of a wide variety of chemicals in industry created a need for a standard and simple hazard identification system. In 1952, the Sectional Committee on Classification, Labeling, and Properties of Flammable Liquids of the NFPA Committee on Flammable Liquids started work on this problem. In 1961, the NFPA adopted, *Recommended System for the Identification of the Fire Hazard of Materials* and, after many revisions, it became a standard in 1975.

Using the system

The NFPA system classifies the hazards of a material in one of four categories: health, flammability, instability, and special. It also indicates the order of severity in each category by five divisions from 4, the most severe hazard, to 0, no special hazard. The information is placed on a diamond with background colors assigned to each type of hazard. The diamond is know as the NFPA 704M Hazard Identification Symbol

Fire Hazards

Introduction

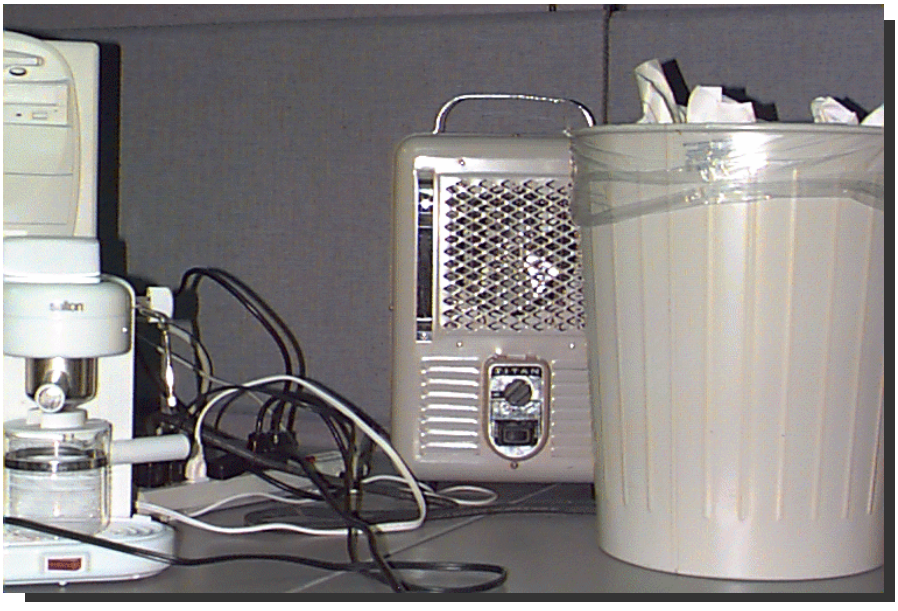
Fire hazards are present in any work situation. An understanding of the fire tetrahedron provides the entire basis you need to identify fire hazards. When identifying fire hazards, look for the four elements necessary to initiate a fire:

- Fuel source
- Oxygen
- Ignition source
- Potential for a chain reaction

Common fire hazards

The table below identifies several common workplace fire hazards. While some of them are normally found in industrial areas only, it is good to be aware of as many hazards as possible.

Hazard	Description
Electrical Equipment	Look for overloaded circuits, frayed insulation, loose ground connections, contact with combustibles, or unapproved equipment.
Flammables	Look for open containers, inadequate ventilation, static electricity, or soiled rags.
Smoking, open flames, and sparks	Make sure none of these occur in a prohibited area.
Space heaters	Most worksites require approval for use on a case-by-case basis.
Welding and cutting	These jobs must be done in a well-ventilated, fireproofed, or screened-off area.
Oxygen cylinders	These cannot be anywhere near combustible materials and must be secured upright.
Motors and machine tools	These must be free of dust and grease buildup and be properly guarded.



Fire Extinguishers

Introduction

Most fires are small at first and can be easily controlled with the proper type of fire extinguisher. Successful use of fire extinguishers depends on the following conditions:

- The extinguisher must be in its proper place and in good working condition.
- The extinguisher must match the class of fire.
- The fire should be detected when small enough for the extinguisher to be effective.
- A person who is well trained in the use of extinguishers must fight the fire.

NFPA general requirements

Fire extinguishers should be

- conspicuously located, and unobstructed
- installed on a hanger, bracket, or placed in a cabinet
- 40 pounds or less, no more than 5 feet high
- greater than 40 pounds, top not more than 3 ½ feet above the floor
- placed with a clearance between bottom and floor of at least 4 inches, and
- installed regardless of other fire-fighting measures.

Extinguishers for more than one class

Some fire extinguishers can be used on one class of fire and some are designed for use on two or three classes of fires. No extinguisher is suitable for all four classes of fires. Extinguishers must be marked as to what class(es) of fires they can be used for.

Pictographs to determine proper use of extinguishers

The following graphic shows NFPA pictographs detailing uses of an extinguisher. These recently developed pictographs are designed so that the extinguisher's proper use may be determined at a glance. When an application is prohibited, the background is black and the slash is bright red.


Class A–trash, wood, paper


Class B–flammable liquids


Class C–electrical equipment


Class C–cooking media

Location and Marking of Extinguishers

Introduction

Extinguishers and their locations must be clearly marked so they can be located quickly. Also, it is critical that the rating class and numeral of an extinguisher be visible so that the proper unit is selected for the fire at hand.

Extinguisher markings should be durable and visible from three feet away. If the pictograph marking system is used, the decal should be visible from the front as the extinguisher hangs. The locations of extinguishers should be marked by painting a red rectangle or band about 8 to 10 feet above them.

If extinguishers for different classes of fires are mounted at the same location, extra attention should be given to distinguishing them.

Extinguisher location

What's missing in the picture below?

Selection, Operation, and Distribution of Extinguishers

Introduction

The selection, operation, and distribution of fire extinguishers are specifically defined in the Code of Federal Regulations (CFR). These requirements are explained in this section.

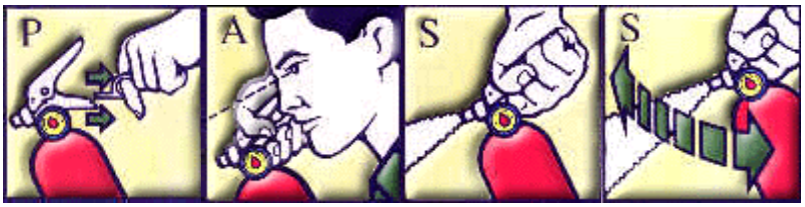
Selection

Before selecting an extinguisher, consider the following:

- The type of combustibles present
- Who will use the extinguisher
- The location of the extinguisher
- The type of chemicals present and their possible reaction with the extinguishing agent
- Whether or not the extinguishing agent is effective on the specific hazards present
- Whether or not the extinguisher's ease of operation and maintenance requirements are reasonable

Operation

The effectiveness of an extinguisher usually depends on who is using it. One person may be able to totally extinguish a fire that someone else, using the same equipment, could not possibly put out. Extinguishers normally discharge their contents in 8 to 15 seconds, leaving little time for experimentation. Improper use of an extinguisher can injure the operator, as well as delay putting out the fire. Thus, it is important that employees be trained in proper use of extinguishers.



Distribution

Fire extinguishers should be readily available. The time needed to travel from the fire to the extinguisher and back should not permit the fire to spread excessively. Provide a uniform distribution of extinguishers about the workplace with easy access to normal paths of travel, exits, and entrances.

Inspection and Maintenance of Fire Extinguishers

Introduction

A fire extinguisher must be maintained. Maintenance consists of

- inspecting each extinguisher periodically
- recharging extinguishers after discharge, and
- performing hydrostatic tests as needed.

Inspection

An inspection is a quick check to visually verify that the extinguisher is properly placed, fully charged, and will function, if needed. An inspection should determine that the extinguisher

- is in its designated place and mounted
- is conspicuous
- has no obstruction to access or visibility
- has operating instructions facing outward
- has not been activated and partially or completely emptied
- has not been tampered with, and
- has not sustained any obvious physical damage.

Visual inspections should be conducted monthly.

Maintenance

Maintenance means a complete and thorough examination of each extinguisher. A maintenance check involves

- disassembling the extinguisher
- examining all its parts
- cleaning and replacing any defective parts
- reassembling
- recharging, and
- repressurizing the extinguisher, when appropriate.

In some cases, maintenance checks must be completed yearly.

Fire Prevention Plan

Introduction

When only certain employees are permitted to fight fires, then the employer **must** implement an emergency action plan and a Fire Prevention Plan (FPP) meeting all the requirements of 29 CFR 1910.38. The FPP is a written plan that must be kept in the workplace and available to all employees. The FPP may be communicated orally if there are 10 or fewer employees.

FPP elements

There are three key elements that should be included in an FPP:

1. A list of all major workplace hazards with their proper handling and storage procedures, potential ignition sources, and type of fire equipment or systems to control a fire involving them.

2. Names or job titles of those responsible for maintenance of equipment and ignition prevention or control systems.

3. A list of job titles or persons responsible for control of fuel source hazards.

Housekeeping

Employers shall control accumulations of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency. These procedures shall be included in the FPP.

Training

The employer should apprise employees of the fire hazards of the materials and processes to which they are exposed. Upon initial assignment, the employer should review with the employee aspects of the plan that are designed for the employee's protection.