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Portable Fire Extinguishers Are Often the First Line of Defense for Fire Suppression

November 2009

A portable fire extinguisher is often the first line of defense against a small fire. A trained person can save lives and property by using an extinguisher to put out or control a small fire until the fire department arrives. However, if the fire is too large and/or intense to use a portable fire extinguisher, you should promptly evacuate the building. As you evacuate, you should activate the closest fire alarm pull station, provided you are not putting yourself at risk.

Types of Fire Extinguishers and Classification of Fires

There are several types of fire extinguishers that are suited for different classes of fires. Carbon dioxide, dry chemical, and wet chemical agent fire extinguishers are some of the many that are used. Halogenated fire extinguisher agents are being phased out because these agents break down the earth's ozone barrier and are considered an environmental hazard. The following table shows which type of fire extinguisher should be used for each class of fire.

Type of Fire and Extinguishing Agent Characteristics	Dry Chemical Extinguisher	Wet Chemical Extinguisher	Carbon Dioxide Extinguisher	Pressurized Water Extinguisher
Class A fires involve ordinary combustible materials such as wood, cloth, paper, and plastics. Class A Extinguishers use agents that cool down the fuel below its ignition temperature or interfere with the combustion chemical process or isolate or dilute vapors from ignition sources.	YES	YES	NO	YES
Class B fires involve flammable and combustible liquids, flammable gases, oils, oil-based paints, solvents, and alcohol. Class B Extinguishers use agents that interfere with the combustion chemical process or isolate or dilute vapors from ignition sources.	YES	NO	YES	NO
Class C fires involve energized electrical equipment, such as overheating electrical wires. Class C Extinguishers use agents that are non-conductors of electricity and interfere with combustion chemical process or isolate or dilute vapors from ignition sources.	YES	NO	YES	NO
Class D fires involve combustible metals such as magnesium, titanium, sodium, lithium, and potassium. Class D Extinguishers use agents that do not provide any additional oxygen and that interfere with or isolate the vapors or fumes from ignition sources.	NO	NO	NO	NO
Class K fires involve cooking appliances or combustible cooking media such as vegetable or animal oils and fats. Class K Extinguishers use agents that cool and interfere with the combustion chemical process or isolate or dilute vapors from ignition sources.	NO	YES	YES	NO

Considerations concerning extinguishing Class B and D fires

Unless there is reasonable assurance that the source of fuel feeding the fire can be completely shut off, do not attempt to extinguish Class B fires because a potential to create a vapor or gas-air explosion hazard can occur. For Class D fires, due to extreme temperatures of the chemical reactions between burning metals and water and other extinguishing agents, dry powder agents are considered to be the most effective extinguishing agents. The application of various types of dry powder agents will depend on the type of combustible metal burning. For example, Met-L-X powder is suitable for magnesium, potassium, and sodium-potassium alloy metal fires, and Na-X powder is suitable for sodium metal fires.

Accessibility and Obstruction

Easy accessibility and visibility of extinguishers are essential because fires spread and grow at a rapid rate. Furthermore, an adequate number of fire extinguishers must be placed throughout the building. Class A fire extinguishers are expected to be placed so that one is available within 75 feet; within 50 feet from the hazard area for Class B extinguishers. Class C is based on the placement of fire extinguishers for Class A or B. The fire extinguisher in Figure 1 is properly hung on the wall but is obscured from view, not easily accessible, and its



Figure 2 Carbon dioxide extinguisher not properly secured and placed.

location is not marked properly. The carbon dioxide extinguishers (CO₂) shown in Figure 2 are not properly secured and placed. Because CO₂ extinguishers are compressed gas cylinders, they must be properly secured by means of a steel bracket or other approved method. In addition, use of CO₂ extinguishers must be limited to open spaces due to the fact that the gas may displace the oxygen in the air, creating a hazardous area for persons within confined spaces.



Figure 1 Fire extinguisher obstructed from view and not easily accessible.

Proper Training

Any person using fire extinguishers in the event of fire must be properly trained per OSHA regulations so that they can evaluate the situation and respond in a timely manner without putting themselves and others at risk. Using a fire extinguisher may seem relatively simple; however, trained responders must assess the type and magnitude of the fire. In some cases, even a trained person may not be able to successfully extinguish a fire. Improper fire extinguisher selection may even cause the fire to spread more rapidly. Therefore, untrained persons should never attempt to use fire extinguishers.

Considerations concerning Class K fires

Class K fires are cooking oil fires. Tests have shown that wet chemical extinguishers are several times more effective than dry chemical agents at extinguishing Class K fires. Class K fire extinguishers must have a placard conspicuously placed near it that states that an existing automatic fire suppression system protecting this area must be activated prior to using the fire extinguisher per National Fire Protection Association, NFPA 10.

Inspection and Maintenance

Fire extinguishers, like all other fire protection systems, need monthly periodic inspections (NFPA 10 Section 7.2.1.2) and annual maintenance (NFPA 10 Section 7.3.1.1.1) to ensure that they are in serviceable condition. The monthly periodic inspection checklist must consist of at least the following items: 1) location in designated space; 2) no obstructions to access or visibility; 3) pressure gauge in the operable range; and 4) no obvious physical damage or conditions such as leakage or corrosion to prevent its operation. In addition, a dry chemical extinguisher with a gauge indicating a low pressure level must be serviced before it can be used again.

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Smaller sized portable fire extinguishers can be completely discharged in 15 seconds or less; therefore operator training and conspicuous placement of accessible extinguishers is most important for effective use. Portable fire extinguishers are often considered to be the first line of defense for fire suppression.

Regulation Requirements

- Fire extinguishers must be maintained in a fully charged and operable condition and shall be kept in their designated places at all times when they are not being used. (NFPA 10 Section 6.1.2 and OSHA 29 CFR§ 1910.157(c)(4))
- Fire extinguishers must be located along normal paths of travel, including exits from areas. (NFPA 10 Section 6.1.3.2)
- Fire extinguishers must be conspicuously located where they are readily accessible and available immediately in the event of fire. (NFPA 10 Section 6.1.3.1 and OSHA 29 CFR§ 1910.157(c)(1))
- OSHA requires that employers “provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting. (29 CFR§ 1910.157(g)(1))
- OSHA requires employers to provide this educational program to those employees who may use fire extinguishers to put out fires “upon initial employment and at least annually thereafter.” (29 CFR§ 1910.157(g)(2))



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