The ABCs, Ds, and Ks of Fire Extinguishers

Extinguishers need to be conspicuously located and available in the case of fire. They should be located along normal paths of travel and near exits.

by Carl McMillan

Fire extinguishers are a common sight wherever you travel, from government buildings to businesses, to restaurants. They are placed in conspicuous locations purposely so they are easy to locate in case of fire. However, even though the placement of fire extinguishers may seem obvious, there are strict guidelines and standards set forth by the Occupational Health and Safety Administration and the National Fire Protection Association. These guidelines and standards concern the classification, labeling, and location of common fire extinguishers.

Classification

Fire extinguishers are classified by the type of fire that they will extinguish.

A Class A fire extinguisher is used for ordinary combustibles, such as wood, paper, some plastics, and textiles. This class of fire requires the heat-absorbing effects of water or the coating effects of certain dry chemicals. Extinguishers that are suitable for Class A fires should be identified by a triangle containing the letter "A."

A Class B fire extinguisher is used for flammable liquid and gas fires such as oil, gasoline, etc. These fire extinguishers deprive the fire of oxygen and interrupt the fire chain by inhibiting the release of combustible vapors. Extinguishers that are suitable for Class B fires should be identified by a square containing the letter "B."

A Class C fire extinguisher is used on fires that involve live electrical equipment, which require the use of electrically nonconductive extinguishing agents. (Once the electrical equipment is de-energized, extinguishers for Class A or B fires may be used.) Extinguishers that are suitable for Class C fires should be identified by a circle containing the letter "C."

A Class D fire extinguisher is used on combustible metals, such as magnesium, titanium, sodium, etc., which require an extinguishing medium that does not react with the
burning metal. Extinguishers that are suitable for Class D fires should be identified by a five-point star containing the letter "D."

A Class K fire extinguisher is used on fires involving cooking media (fats, grease, and oils) in commercial cooking sites such as restaurants. These fire extinguishers work on the principle of saponification. Saponification takes place when alkaline mixtures, such as potassium acetate, potassium citrate, or potassium carbonate, are applied to burning cooking oil or fat. The alkaline mixture combined with the fatty acid creates a soapy foam on the surface that holds in the vapors and steam and extinguishes the fire. These extinguishers are identified by the letter K.

**Labeling**

Fire extinguishers are labeled so users can quickly identify the classes of fire on which the extinguisher will be effective. The marking system combines pictographs of both recommended and unacceptable extinguisher types on a single identification label. Following are examples of typical labels.

Also located on the fire extinguisher label is the UL rating. The UL rating is broken down into Class A and Class B:C ratings. These numerical ratings allow you to compare the relative extinguishing effectiveness of various fire extinguishers. For example, an extinguisher that is rated 4A:20B:C indicates the following:

1. The A rating is a water equivalency rating. Each A is equivalent to 1 1/4 gallons of water. 4A = 5 gallons of water.
2. The B:C rating is equivalent to the amount of square footage that the extinguisher can cover, handled by a professional. 20 B:C = 20 square feet of coverage.
3. C indicates it is suitable for use on electrically energized equipment.

When analyzing these ratings, note there is not a numerical rating for Class C or Class D fires. Class C fires are essentially either a Class A or a Class B fire involving energized electrical equipment where the fire extinguishing media must be non-conductive. The fire extinguisher for a Class C fire should be based on the amount of the Class A or Class B component. For extinguisher use on a Class D fire, the relative effectiveness is detailed on the extinguisher nameplate for the specific combustible metal fire for which it is recommended.

**Location**

OSHA requires that employers select and distribute fire extinguishers based on the classes of anticipated workplace fires and also on the size and degree of the hazard that would affect their use. The following chart contains OSHA requirements for classes of fires and travel distance to an extinguisher. Note there is no distance requirement for Class K extinguishers. Typically they are located at the point of possible cooking fire ignition. Some local requirements may be
strictly, so you should always check with your local fire marshal and insurance agent.

<table>
<thead>
<tr>
<th>Fire Class</th>
<th>Travel Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>75 feet (22.9 m) or less</td>
</tr>
<tr>
<td>Class B</td>
<td>50 feet (15.2 m)</td>
</tr>
<tr>
<td>Class C</td>
<td>Based on appropriate A or B Hazard</td>
</tr>
<tr>
<td>Class D</td>
<td>75 feet</td>
</tr>
</tbody>
</table>

Extinguishers need to be conspicuously located and available in the case of fire. They also should be located along normal paths of travel and near exits. Portable fire extinguishers that are not wheeled should be installed on the hanger or bracket supplied, or placed in cabinets or wall recesses.

The locations of fire extinguishers must be identified so they are readily available to employees without subjecting them to injury. Height requirements for mounting extinguishers depend on the weight of the unit. If the unit weighs less than 40 pounds, it should be installed so the top of the extinguisher is no more than 5 feet above the floor. If the unit weighs more than 40 pounds, it should be installed so the top of the extinguisher is no more than 3.5 feet above the floor. At no point should the extinguisher be less than 4 inches from the floor.

Instead of Class A portable fire extinguishers, an employer may use uniformly spaced standpipe systems or hose stations connected to a sprinkler system installed for emergency use by employees. Such systems must meet the respective requirements of 29 CFR 1910.158 or 1910.159 which provide total coverage of the area to be protected, and have employees that are trained at least annually in their use.

**Training**

Where the employer has provided fire extinguishers for employee use, the employer must provide an educational program to familiarize employees on the principles and use of the extinguishers. This educational program should be completed during the initial hiring and annually thereafter.

**Inspections**

Portable fire extinguishers must be visually inspected monthly. The inspection should assure that:

1. Fire extinguishers are in their assigned place
2. Fire extinguishers are not blocked or hidden
3. Fire extinguishers are mounted in accordance with NFPA Standard No. 10 (Portable Fire Extinguishers)
4. Pressure gauges show adequate pressure (a CO₂ extinguisher must be weighed to determine whether leakage has occurred)
5. Pin and seals are in place
6. Fire extinguishers show no visual sign of damage or abuse
7. Nozzles are free of blockage

Maintenance, inspection, and testing of an extinguisher are the responsibility of the employer. Maintenance should be done at least annually or more often if conditions warrant. The employer shall record the annual maintenance date and keep these records for one year after the recorded date or the life of the shell of the extinguisher.

Hydrostatic testing of portable fire extinguishers is done to protect against unexpected in-service failure. This can be caused by internal corrosion, external corrosion, damage from abuse, etc. Hydrostatic testing must be performed by trained personnel with proper test equipment and facilities. OSHA requires hydrostatic testing according to the schedule listed in 29 CFR 1910.157 Table L-1.

Fire extinguishers that are correctly used on the type of fire they are intended for can have a large role in stopping major fire damage and dollar losses. When walking by a fire extinguisher, you'll know that all of the letters and numbers have specific meanings and why it is located where it is.

This article appears in the August 2004 issue of *Occupational Health & Safety*. 