

City of

# Ketchikan

Alaska's 'First City'



## Fire Extinguishers – General Information

Many fires are small at origin and can be extinguished by the use of proper portable fire extinguishers. It is strongly recommended that the fire department be notified as soon as a fire is discovered. This alarm should not be delayed by awaiting the results of the application of portable fire extinguishers.

Fire extinguishers can represent an important segment of any overall fire protection program. However, their successful functioning depends upon the following conditions having been met:

- (1) The fire extinguisher is properly located and in working order.
- (2) The fire extinguisher is of the proper type for a fire that can occur.
- (3) The fire is discovered while still small enough for the fire extinguisher to be effective.
- (4) The fire is discovered by a person ready, willing, and able to use the fire extinguisher.

### TYPES OF FIRES

**CLASS A** ORDINARY COMBUSTIBLES: wood, paper, cloth, trash and other ordinary materials.



**CLASS B** FLAMMABLE LIQUIDS & GASES: gasoline, oils, paint lacquer and tar.



**CLASS C** FIRES INVOLVING LIVE ELECTRICAL EQUIPMENT.



**CLASS D** COMBUSTIBLE METALS OR COMBUSTIBLE METAL ALLOYS (NO picture symbol)



### TYPES OF EXTINGUISHERS

**CLASS A**



**CLASS A:B**

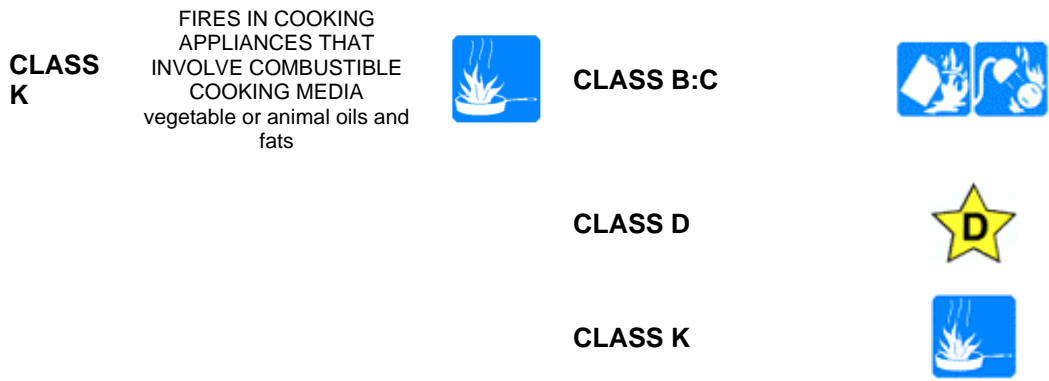


**CLASS A:B:C**



**CLASS A:C**





### Class K Extinguishers

Fire extinguishers for the protection of cooking media fires (vegetable or animal oils and fats) traditionally required a minimum 40-B rated sodium bicarbonate or potassium bicarbonate dry chemical extinguisher as specified for extra (high) hazard requirements of NFPA 10. The evolution of high-efficiency cooking appliances and the change to hotter-burning vegetable shortening has created a more severe fire hazard and has prompted the creation of a new classification of fire, Class K. Testing by Underwriters Laboratories has shown that wet chemical extinguishers with a K classification have several times the extinguishing capability of a 40-B rated sodium bicarbonate or potassium bicarbonate extinguisher in controlling cooking fires. The Class K extinguisher offers improved fire control for this type of hazard by:

- (1) Creating a foam blanket by saponifying (converting into a soap) the hot cooking oils.
- (2) Cooling both the appliance and the hot cooking oils.
- (3) Offering improved visibility during fire fighting.
- (4) Minimizing splash hazard.
- (5) Providing easier clean-up than when using dry chemical agents.

Accordingly, the Fire Equipment Manufacturers' Association, Inc. [FEMA] recommends that all Class B extinguishers used to protect cooking appliances/kitchens be replaced by the owners with Class K extinguishers as soon as possible. The travel distance of 30 feet as previously described in NFPA 10 is still recommended.

### Class K Rating Tests

Class K rated fire extinguishers are rated for their ability to fight fire in commercial cooking environments. The newest version of the UL Standard 300, Standard for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas, is more restrictive than previous tests in commercial cooking media. The fuel used must be

new vegetable shortening or oil with an anti-foaming agent and an auto-ignition temperature of 685 degrees Fahrenheit (362.7 degrees Celsius) or higher. Tests are performed on four types of cooking appliances: fryers, ranges, griddles, and woks. Manufacturers of hood extinguishing systems are now using the potassium-based liquid agents (potassium acetate, potassium carbonate, and potassium citrate) for installation in commercial kitchens because sodium bicarbonate is no longer used.

## **Class K Extinguisher Distribution Factors**

In the working environment of commercial cooking occupancies, fire is always present. Employees in such areas are charged with the responsibility to maintain appropriate cooking temperatures to ensure safety. Because employees are in various levels of training for their jobs and because there is potential of fire hazards occurring in an assembly area (dining room), NFPA 10 has assigned a more restrictive distance requirement. In areas where Class K fires are likely, the maximum travel distance from the hazard to the extinguisher is reduced to 30 feet (10 m).

In addition to proper selection and distribution, effective use of fire extinguishers requires that they be readily visible and accessible. Proper placement of extinguishers should provide the following:

- (1) Extinguishers should be visible and well marked.
- (2) Extinguishers should not be blocked by storage or equipment.
- (3) Extinguishers should be near points of egress or ingress.
- (4) Extinguishers should be near normal paths of travel.
- (5) Extinguishers should be placed so that all personnel can access it.
- (6) Extinguishers with a gross weight not exceeding 40 pounds (18 kg) should be installed so that the top of the extinguisher is not more than 5 feet (1.5 m) above the floor.
- (7) Extinguishers with a gross weight greater than 40 pounds (18 kg), except wheeled types, should be installed so that the top of the extinguisher is not more than 3 ½ feet (1 m) above the floor.
- (8) The clearance between the bottom of the extinguisher and the floor should never be less than 4 inches (100 mm).

## **Attacking Class K Fires**

Class K (cooking media) fires are particularly difficult to extinguish because of their tendency to reignite after the fire has been extinguished. It has been discovered that although a Class K fire may have been extinguished properly with a dry chemical, the fuel changes chemically and reaches auto-reignition at a lower temperature. For this

reason, only an extinguisher with a Class K rating is recommended for use on this type of fire.

The initial attack on a Class K fire with an appropriately marked Class K extinguisher is similar to other types of attack. Begin application from a distance of 10-12 feet (3.1 to 4 m) away from the burning material, hold the application wand at the edge of the flames, and coat the surface of the material with a side-to-side sweep. Continue to apply agent until the fire extinguisher is completely empty. Extinguishment takes place through cooling the fuel. It is the innate cooling quality of the agent, along with its ability to form soapy foam (saponification) that prevents the fuel from reaching a lower reignition temperature.

## **FREQUENTLY ASKED QUESTIONS ON UL 300 SYSTEMS AND CLASS K EXTINGUISHERS**

**Question:** NFPA and FEMA have always promoted extinguishers as “your first line of defense” in a fire situation. With regard to commercial kitchen cooking hazards, why are placards now required to be posted above class “K” extinguishers stating the cooking appliance fire suppression system is to be activated prior to using the portable fire extinguisher?

**Answer:** In recent years, the development of high-efficiency cooking appliances that employ high-energy input/output rates, as well as the widespread use of vegetable oils having high auto-ignition temperatures, results in a fire at the onset of ignition, already being too hot! Portable extinguishers have proven to be extremely effective but they cannot shut down the fuel source; therefore, after their discharge duration, the appliance may not have been cooled effectively enough to prevent reflash. The effective way to extinguish this type of fire is to REMOVE ITS HEAT SOURCE by activating the commercial kitchen pre-engineered suppression system. This action provides elimination of the fuel source (gas valve or electric power off) and then blankets the hot cooking oil with thick foam produced by the agent contained in the extinguishing system. Activating the system FIRST places both of these extinguishing initiatives into motion. The portable extinguisher can then be used as follow-up in the event it is needed. (For additional information refer to NFPA-10 and NFPA-96)

**Question:** Statistics prove commercial kitchen pre-engineered fire suppression systems are reliable and successful. If this is the case, WHY must I still provide a portable extinguisher for these hazards?

**Answer:** Studies conducted by National Association of Fire Equipment Distributors found commercial kitchen pre-engineered fire suppression systems to be 95% reliable and successful in suppressing kitchen cooking hazard fires. Of the 5% found not to have extinguished the fire, improper installation or tampering was determined the cause. Having the extinguisher available in the event of a system failure is essential and both NFPA-10 and NFPA-96 mandate their requirement. Also, the

extinguisher can be utilized in the unlikely event grease spills causing the fire to spread outside the hazard area of protection. If cooking appliances are moved for any reason outside such parameters of coverage or should the fire originate as a result of a cooking media spill beyond the surface of the appliance, having a K class extinguisher readily available is an important fire protection consideration. (For additional information refer to NAFED published reports, NFPA-10 and NFPA-96)

**Question:** Is a commercial kitchen pre-engineered fire suppression system required to protect the cooking hazard located in my church, town hall, meeting facility or other similar occupancy?

**Answer:** NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, dictates that cooking equipment used in processes producing smoke or grease-laden vapors shall be equipped with an exhaust system that complies with all the equipment and performance requirements of this (NFPA 96) standard. Most states have adopted NFPA 96 through their Building and Fire Prevention Codes. Compliance of these codes and standards includes the installation of a Commercial Kitchen Cooking Pre-engineered Fire Suppression System to protect the hood(s), duct(s) and cooking appliance(s). Facility size or cooking capacity is NOT a factor and does not negate this requirement. These types of occupancies often hold socials, fund raising events and dinners that, as part of the event, utilize the cooking facility. Cooking isn't limited to boiling water, making soup or warming things up. In many of these situations the food being served requires frying, broiling, sautéing, etc. which produce smoke or grease laden vapors and increases the potential of a kitchen cooking appliance fire in these occupancies. (For additional information refer to NFPA-96 and your local Building and Fire Prevention Codes)

**Question:** For years, having a 40B:C rated sodium bicarbonate extinguisher in my cooking area was acceptable. Why am I now being told to replace it with a new class "K" rated fire extinguisher?

**Answer:** As stated in question 1, the fire hazard has simply changed and become more difficult to control. While the old 40B:C sodium bicarbonate fire extinguisher requirement existed for many years, it is no longer suitable for addressing many of the newer forms of cooking appliances and cooking media formulations commonly found in use today. Dry chemical extinguishers are not effective in removing the tremendous heat that is generated by this type of hazard. The fire can easily reignite or won't be extinguished at all. Leaving the BC sodium bicarbonate extinguisher in place provides one a FALSE sense

of fire safety. The new class “K” rated fire extinguishers are much better suited to properly handle and address the special cooking appliance fire hazards found in commercial kitchens. (For additional information refer to NFPA-10, 17/17A, 96 and ANSI/UL-711 test standard).

**Question:** If a small fire breaks out in or on the surface of my cooking appliance(s), can I first try to use the portable fire extinguisher prior to activating the commercial kitchen pre-engineered fire suppression system?

**Answer:** Kitchen fires have a long history of quickly spreading and getting out of control. Any delay in activation of the commercial kitchen pre-engineered fire suppression system, caused by first attempting to use a portable extinguisher, can give a fire all the advantage it needs to go beyond the capability and limitations of the fire suppression system. This type of fire can quickly engulf the grease removal filters, hood plenum and ducts. Since these areas are somewhat out of sight to the chef, it would be possible for a fire to survive in these areas and grow without his/her knowledge. Activating the commercial kitchen pre-engineered fire suppression system FIRST assures the fuel source has been eliminated, as well as the application of extinguishing agent being applied to the cooking appliance(s), hood(s) and duct(s) providing for fire extinguishments. The extinguisher can then be used as follow-up in the event it is needed.

**Question:** Since there are multiple sizes of Class K extinguishers, and NFPA-10 doesn't address any difference in regard to size and rating, how can I, as a consumer of the AHJ, know which size class K extinguisher would be adequate for the commercial kitchen hazards or to meet the intent of the local Building or Fire Code?

**Answer:** Fire extinguishers classified for use on Class K hazards are not required to have a number preceding the classification letter. Therefore, any extinguisher rated for Class K hazards is acceptable from the standpoint of satisfying the code. One should however, also take into consideration the size of the hazard as cooking lines and cooking appliances vary widely. The bigger the hazard, the bigger the extinguisher one should consider. As with other class rated extinguishers, Class K rated extinguishers come in smaller and larger sizes. In hazards where multiple fryers, wood burning appliances, or the cooking hazard is very large, multiple units or larger Class K rated extinguishers should be considered. For example, one 6-liter Class K extinguisher should be provided for up to four fryers of 80 pounds capacity each. Either one 2.5

gallon or two 6-liter Class K extinguishers should be provided for up to eight fryers. The advantage of the larger size unit is having more wet chemical agent available to control/extinguish a fire should one occur. Also, since most kitchen areas will contain Class A & B hazards, the larger Class K extinguisher may prove to be of benefit controlling a fire of that nature should the fire spread outside the cooking area. (For additional information refer to NFPA-10 and Manufacturers' Training Manuals)

IN ALL CASES ABOVE, fire extinguishers not only provide for fire fighting capabilities, but can also be used for emergency egress situations. If a fire were to occur that obstructed an egress path, the extinguisher may prove an effective tool in clearing a path of egress allowing for successful evacuation.

## **NFPA 10**

3.3.4.5 Class K Fires: Fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fat).

4.2.1.5 Fire extinguishers for the protection of Class K hazards shall be selected from types that are specifically listed and labeled for use on Class K fires.

4.3.2 Class K Fire Extinguishers for Cooking Oil Fires. Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) shall be listed and labeled for Class K fires. Class K fire extinguishers manufactured after January 1, 2002, shall not be equipped with "extended wand-type" discharge devices.

4.3.2.1 Fire extinguishers installed specifically for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) prior to June 30, 1998, shall not be required to comply with 4.3.2.

4.3.2.2 A placard shall be conspicuously placed near the extinguisher that states that the fire protection system shall be activated prior to using the fire extinguisher. Recommended size is 7 5/8 in. x 11 in.

4.3.2.3 Existing dry chemical extinguishers without a Class K listing that were installed for the protection of Class K hazards shall be replaced with an extinguisher having a Class K listing when the dry chemical extinguishers become due for either a 6-year maintenance or hydrostatic test.

### **5.7 Fire Extinguisher Size and Placement for Class K Fires.**

5.7.1 Class K fire extinguishers shall be provided for hazards where there is a potential for fires involving combustible cooking media (vegetable or animal oils and fats).

5.7.2 Maximum travel distance shall not exceed 30 ft. (9.15 m) from the hazard to the extinguishers.

## **NFPA 96**

### **10.1 General Requirements**

10.1.1 Fire extinguishing equipment for the protection of grease removal devices, hood exhaust plenums, and exhaust duct systems shall be provided.

10.1.2 Cooking equipment that produces grease-laden vapors and that might be a source of ignition of grease in the hood, grease removal device, or duct shall be protected by fire-extinguishing equipment.

### **10.2 Types of Equipment**

10.2.1 Fire-extinguishing equipment shall include both automatic fire-extinguishing systems as primary protection and portable fire extinguishers as secondary backup.

10.2.2 A placard identifying the use of the extinguisher as a secondary backup means to the automatic fire-extinguishing system shall be conspicuously placed near each portable fire extinguisher in the cooking area.

10.2.2.1 The language and wording of the placard shall be approved by the authority having jurisdiction.

# FIRE EMERGENCY CHECK LIST

<facility address, suite number, agency and section identifiers>

## POST THIS NOTICE AT EVERY EXTINGUISHER STATION

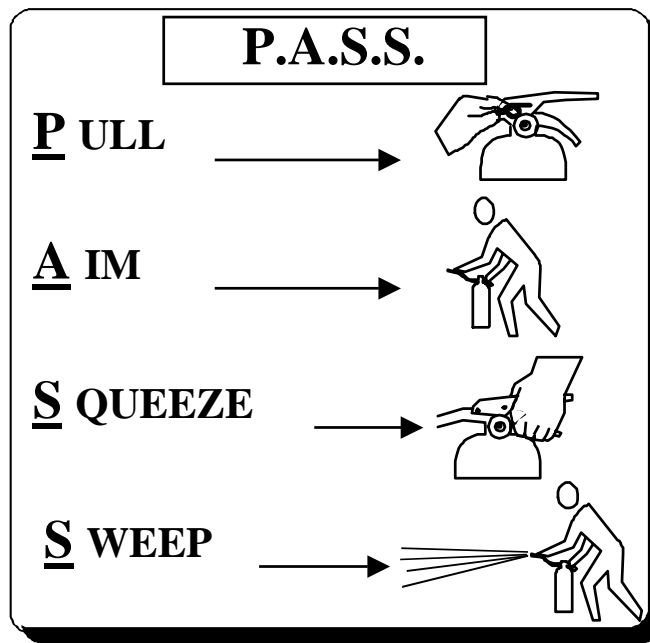
Primary Floor Monitor is: <name> <office cubicle><phone extension>  
Alternate Monitor is: <name> <office cubicle><phone extension>  
Emergency Safety Coordinator (ESC) <name> <office cubicle><phone extension>

- Has 911 been called? *If not CALL 911 NOW!*
- Has SECURITY been contacted? *If not CALL ext xxx NOW!*
- Has building ALARM been activated? *If not, activate alarm NOW!*

## Complete Your "Fight or Flight" Assessment:

- 1. Building is being evacuated (*Fire alarm has been pulled*)
- 2. Fire Department has been called (Dial 911!)
- 3. The Fire is small, contained and **NOT** spreading
- 4. The **EXIT IS CLEAR** (can you fight the fire with your back to an exit?)
- 5. Extinguisher is of the proper type and rating for the fire:

THIS EXTINGUISHER IS TYPE \_\_\_\_\_ RATED \_\_\_\_\_



**USE** the "Buddy System" - *get assistance BEFORE trying to fight a fire!*

***CONTINUE a complete building evacuation. Do not attempt to fight a fire UNLESS you have been TRAINED and CERTIFIED in proper use of THIS fire extinguisher!***