

# Fire Safety and Extinguishers

## Types of Extinguishers

With so many fire extinguishers to choose from, selecting the proper one for your home can be a daunting task. Everyone should have at least one fire extinguisher at home, but it's just as important to ensure you have the proper type of fire extinguisher. Fire protection experts recommend one for the kitchen, the garage and workshop.

Fire extinguishers are divided into four categories, based on different types of fires. Each fire extinguisher also has a numerical rating that serves as a guide for the amount of fire the extinguisher can handle. The higher the number, the more fire-fighting power. The following is a quick guide to help choose the right type of extinguisher.



- **Class A** extinguishers are for ordinary combustibles such as paper, wood, cardboard, and most plastics. The numerical rating on these types of extinguishers indicates the amount of water it holds and the amount of fire it can extinguish.
- **Class B** fires involve flammable or combustible liquids such as gasoline, kerosene, grease and oil. The numerical rating for class B extinguishers indicates the approximate number of square feet of fire it can extinguish.
- **Class C** fires involve electrical equipment, such as appliances, wiring, circuit breakers and outlets. Never use water to extinguish class C fires - the risk of electrical shock is far too great! Class C extinguishers do not have a numerical rating. The C classification means the extinguishing agent is non-conductive.
- **Class D** fire extinguishers are commonly found in a chemical laboratory. They are for fires that involve combustible metals, such as magnesium, titanium, potassium and sodium. These types of extinguishers also have no numerical rating, nor are they given a multi-purpose rating - they are designed for class D fires only.

Some fires may involve a combination of these classifications. Your fire extinguishers should have ABC ratings on them.

Here are the **most common types of fire extinguishers**:

- **Water extinguishers** or APW extinguishers (air-pressurized water) are suitable for **class A fires only**. Never use a water extinguisher on grease fires, electrical fires or class D fires - the flames will spread and make the fire bigger! Water extinguishers are filled with water and pressurized with oxygen. Again - water extinguishers can be very dangerous in the wrong type of situation. Only fight the fire if you're certain it contains ordinary combustibles only.
- **Dry chemical** extinguishers come in a variety of types and are suitable for a combination of **class A, B and C fires**. These are filled with foam or powder and pressurized with nitrogen.
  - **BC** - This is the regular type of dry chemical extinguisher. It is filled with sodium bicarbonate or potassium bicarbonate. The BC variety leaves a mildly corrosive residue which must be cleaned immediately to prevent any damage to materials.
  - **ABC** - This is the multipurpose dry chemical extinguisher. The ABC type is filled with monoammonium phosphate, a yellow powder that leaves a sticky residue that may be damaging to electrical appliances such as a computer

Dry chemical extinguishers have an advantage over CO2 extinguishers since they leave a non-flammable substance on the extinguished material, reducing the likelihood of re-ignition.

- **Carbon Dioxide (CO<sub>2</sub>) extinguishers** are used for **class B and C fires**. CO<sub>2</sub> extinguishers contain carbon dioxide, a non-flammable gas, and are highly pressurized. The pressure is so great that it is not uncommon for bits of dry ice to shoot out the nozzle. They don't work very well on class A fires because they may not be able to displace enough oxygen to put the fire out, causing it to re-ignite.

CO<sub>2</sub> extinguishers have an advantage over dry chemical extinguishers since they don't leave a harmful residue - a good choice for an electrical fire on a computer or other favorite electronic device such as a stereo or TV.

**It is vital to know what type of extinguisher you are using. Using the wrong type of extinguisher for the wrong type of fire can be life-threatening.**

These are only the common types of fire extinguishers. There are many others to choose from. Base your selection on the classification and the extinguisher's compatibility with the items you wish to protect.

Fire needs fuel, oxygen and heat in order to burn. In simple terms, fire extinguishers remove one of these elements by applying an agent that either cools the burning fuel, or removes or displaces the surrounding oxygen.

Fire extinguishers are filled with water or a smothering material, such as CO<sub>2</sub>. By pulling out the safety pin and depressing the lever at the top of the cylinder (the body of the extinguisher), this material is released by high amounts of pressure.

#### **How it Works**

At the top of the cylinder, there is a smaller cylinder filled with compressed gas. A release valve acts as a locking mechanism and prevents this gas from escaping. When you pull the safety pin and squeeze the lever, the lever pushes on an actuating rod which presses the valve down to open a passage to the nozzle. The compressed gas is released, applying a downward pressure on the fire-extinguishing material. This pushes the material out the nozzle with high amounts of pressure.

Although the temptation is to aim the extinguisher at the flames, the proper way to use the extinguisher is to aim it directly at the fuel.

#### **Water Extinguishers**

Water extinguishers are filled with regular tap water and pressurized with oxygen. The best way to remove heat is to dump water on the fire but, depending on the type of fire, this is not always the best option.

#### **Dry Chemical Extinguishers**

Dry chemical extinguishers are filled with either foam or powder, usually sodium bicarbonate (baking soda) or potassium bicarbonate, and pressurized with nitrogen. Baking soda is effective because it decomposes at 158 degrees Fahrenheit and releases carbon dioxide (which smothers oxygen) once it decomposes. Dry chemical extinguishers interrupt the chemical reaction of the fire by coating the fuel with a thin layer of powder or foam, separating the fuel from the surrounding oxygen.

#### **Carbon Dioxide (CO<sub>2</sub>) extinguishers**

CO<sub>2</sub> extinguishers contain carbon dioxide, a non-flammable gas, and are highly pressurized. The pressure is so great that it is not uncommon for bits of dry ice to shoot out. CO<sub>2</sub> is heavier than oxygen so these extinguishers work by displacing or taking away oxygen from the surrounding area. CO<sub>2</sub> is also very cold so it also works by cooling the fuel.

## Using Extinguishers

Before using your fire extinguisher, be sure to read the instructions before it's too late. Although there are many different types of fire extinguishers, all of them operate in a similar manner.

Use this acronym as a quick reference (it is a good idea to print this reference and pin it next to your fire extinguisher):

**P A S P S**

**Pull the Pin** at the top of the extinguisher. The pin releases a locking mechanism and will allow you to discharge the extinguisher.

**Aim at the base of the fire**, not the flames. This is important - in order to put out the fire, you must extinguish the fuel.

**Squeeze the lever slowly**. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.

**Sweep from side to side**. Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher - different fire extinguishers recommend operating them from different distances. Remember: Aim at the base of the fire, not at the flames!!!!

A typical fire extinguisher contains 10 seconds of extinguishing power. This could be less if it has already been partially discharged. Always read the instructions that come with the fire extinguisher beforehand and become familiarized with its parts. It is highly recommended by fire prevention experts that you get hands-on training before operating a fire extinguisher. Most local fire departments offer this service.

Once the fire is out, don't walk away! Watch the area for a few minutes in case it re-ignites. Recharge the extinguisher immediately after use.

## Maintaining Extinguishers

**Inspect fire extinguishers** at least once a month (more often in severe environments).

**Fire extinguisher maintenance** is important for everyone's safety.

**If the extinguisher is damaged or needs recharging**, replace it immediately!

You must ensure that:

- The extinguisher is not blocked by equipment, coats or other objects that could interfere with access in an emergency.
- The pressure is at the recommended level. On extinguishers equipped with a gauge (such as that shown on the right), the needle should be in the green zone - not too high and not too low.
- The nozzle or other parts are not hindered in any way.
- The pin and tamper seal (if it has one) are intact.
- There are no dents, leaks, rust, chemical deposits and/or other signs of abuse/wear. Wipe off any corrosive chemicals, oil, gunk etc. that may have deposited on the extinguisher.

Some manufacturers recommend shaking your dry chemical extinguishers once a month to prevent the powder from settling/packing.

Fire extinguishers should be pressure tested (a process called hydrostatic testing) after a number of years to ensure that the cylinder is safe to use. Consult your owner's manual, extinguisher label or the manufacturer to see when yours may need such testing.

**IMPORTANT: Recharge all extinguishers immediately after use regardless of how much they were used.**

An inspection is a “quick check” to give reasonable assurance that a fire extinguisher is available, fully charged and operable. The value of an inspection lies in the frequency, regularity, and thoroughness with which it is conducted. The frequency will vary from hourly to monthly, based on the needs of the situation. Inspections should always be conducted when extinguishers are initially placed in service and thereafter at approximately 30-day intervals.

## **MAINTENANCE**

Fire extinguishers should be maintained at regular intervals (at least once a year), or when specifically indicated by an inspection. Maintenance is a “thorough check” of the extinguisher. It is intended to give maximum assurance that an extinguisher will operate effectively and safely. It includes a thorough examination and any necessary repair, recharging or replacement. It will normally reveal the need for hydrostatic testing of an extinguisher.

## **Location of Extinguishers**

Having a fire extinguisher is one thing, having it handy in case of an emergency, is another.

It is recommended to have at least one fire extinguisher on each floor of your home. Also, keep them in plain sight and no more than five feet above the floor. Do not put them in closets because that will cost you valuable time when you are reaching for it. And even though a fire extinguisher may not match your décor, do not put it behind curtains or drapes.

The most important places to have a fire extinguisher are in areas that are more susceptible to fire. These areas are the kitchen and the garage.

**Kitchen:** According to U.S. Fire Administration statistics, the kitchen is the place where fires most often start. If you have a fire extinguisher in the kitchen, most grease fires can be contained. Do not put the fire extinguisher near the stove as it will be out of your reach if the fire is on the stovetop. You should not have to risk burns just to reach your extinguisher. Therefore, the best place to put the fire extinguisher is by the door of the kitchen so you have easy access to it.

**Garage:** It is a good idea to keep a fire extinguisher here because in most homes, this is the place we use as storage. Often, leftover paints, solvents, and building materials will be piled up without a second thought. Again, the best location to mount the fire extinguisher is by the door.

## **Fire Prevention**

The National Fire Protection Association reports 85% of fire deaths occur in the home, making fire prevention a top priority in every home. Here is a list of some of the less obvious tips for fire prevention, based on the most common causes of fires:

### **Cooking equipment**

- Keep appliances clean, and wipe surfaces after spills. Clean stove surfaces and ovens regularly.
- Wear tight-fitting sleeves, or roll them up when cooking
- Keep flammable objects, including pot holders, dish towels and curtains, at least three feet away from the stove.
- Wood and coal stoves, fireplaces, chimneys, and all other solid-fueled heating equipment needs to be inspected annually by a professional and cleaned accordingly.
- Assure microwaves have enough room to breathe, that all the vents are cleared of obstructions.
- If there is a microwave fire, keep the door closed and unplug the microwave. Make sure to have the microwave oven serviced before you use it again.
- If there is an oven fire, keep the door closed and turn off the heat. If the fire doesn't go out immediately, call the fire department.

- A grease fire occurs when oil or greasy foods are heated and ignite. The simplest way to fight a grease fire is to carefully slide a lid over the pan. Turn off the burner, don't move the pan, and keep the lid on until the pan cools completely. Baking Soda may also be used to suffocate the fire. **NEVER PUT WATER ON A GREASE FIRE.** Water causes the grease to splatter and the fire to spread. Also, NEVER attempt to take a grease fire outdoors. It will be too hot to carry and you will drop it, causing a major house fire.

### Heating Equipment

- Heating equipment is the leading cause of home fires during the winter months of December, January and February, and is the second leading cause of home fires year round.
- When buying heaters, look for devices with automatic shutoff features.
- Be sure any gas-fueled heating device is installed with proper attention to ventilation, and never put un-vented gas space heaters in bedrooms or bathrooms. Liquefied Petroleum (LP) gas heaters with self-contained fuel supplies are prohibited for home use by NFPA codes.
- Never leave space heaters on when you leave the room.
- Space heaters should be kept at least three feet away from anything that can burn.
- Don't use extension cords with space heaters. The high amount of current they require could melt the cord and start a fire.
- When lighting a gas space heater, strike your match first, then turn on the gas.
- Never use a gas range as a substitute for a furnace or space heater.

### Electrical Distribution Equipment

- Wiring, outlets, switches, circuit breakers and other electrical devices are the third leading cause of home fires and the second leading cause of fire deaths.
- Replace or repair loose or frayed cords on all electrical devices.
- If outlets or switches feel warm, shut off the circuit and have them checked by an electrician.
- Try to avoid extension cords. If you feel an extension cord is necessary, make sure that it is not frayed or worn. Do not run it under carpet or around doorways.
- Never overload a socket. The use of "octopus" outlets or "power bar", outlet extensions that accommodate several plugs, is strongly discouraged. Try to limit one high-wattage appliance into each individual outlet at a time.
- If a circuit breaker trips or a fuse blows frequently, cut down on the number of appliances on that line. In many older homes, the capacity of the wiring system has not kept pace with today's modern appliances and can overload electrical systems. Some overload signals include: dimming lights when an appliance goes on, fuses blowing frequently or shrinking TV picture.
- Assure there's plenty of air space around home entertainment units such as the TV and stereo to avoid overheating.

Although some fires are caused by electrical system failures and appliance defects, many are caused by the misuse and poor maintenance of electrical appliances, incorrectly installed wiring, and overloaded circuits and extension cords.

### Other Sources

- Never smoke in bed. Always look under cushions and in trashcans for burning cigarettes before going to bed. Check carpeting where ashtrays have been used.
- Get rid of stored newspaper or other unnecessary materials. Newspapers stored in a damp, warm place may ignite spontaneously.
- Install smoke detectors on every level of your home and outside of sleeping areas.
- Mount a fire extinguisher in the kitchen, garage and workshop.
- Agree in advance on an escape plan. There should be at least two exits in every room.

**Note:** Half of all home fire deaths occur at night, so fire hazard checks and special attention to fire prevention should occur before going to bed.

## Fighting a Fire

All fires can be very dangerous and life-threatening. Your safety should always be your primary concern when attempting to fight a fire.

### Before deciding to fight a fire, be certain that:

- The fire is small and not spreading. A fire can double in size within two or three minutes.
- You have the proper fire extinguisher for what is burning.
- The fire won't block your exit if you can't control it. A good way to ensure this is to keep the exit at your back.
- You know your fire extinguisher works. Inspect extinguishers once a month for dents, leaks or other signs of damage. Assure the pressure is at the recommended level. On extinguishers equipped with a gauge, the needle should be in the green zone - not too high and not too low.
- You know how to use your fire extinguisher. There's not enough time to read instructions when a fire occurs.

### How to Fight a Fire Safely:

- Always stand with an exit at your back.
- Stand several feet away from the fire, moving closer once the fire starts to diminish.
- Use a sweeping motion and aim at the base of the fire.
- If possible, use a "buddy system" to have someone back you up or call for help if something goes wrong.
- Be sure to watch the area for awhile to ensure it doesn't re-ignite.

### Never Fight A Fire If:

- **The fire is spreading rapidly.** Only use a fire extinguisher when the fire is in its early stages. If the fire is already spreading quickly, evacuate and call the fire department.
- **You don't know what is burning.** Unless you know what is burning, you won't know what type of fire extinguisher to use. Even if you have an ABC extinguisher, there could be something that will explode or produce highly toxic smoke.
- **You don't have the proper fire extinguisher.** The wrong type of extinguisher can be dangerous or life-threatening.
- **There is too much smoke or you are at risk of inhaling smoke.** Seven out of ten fire-related deaths occur from breathing poisonous gases produced by the fire.

Any sort of fire will produce some amount of carbon monoxide, the most deadly gas produced by a fire. Materials such as wool, silk, nylon and some plastics can produce other highly toxic gases such as carbon dioxide, hydrogen cyanide, or hydrogen chloride. Beware - all of these can be fatal. Smoke inhalation or exposure to fire itself can be life threatening so get educated about the basics in CPR and burn treatment.