

## HOW FIRE EXTINGUISHERS WORK

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.