4.4.4 Fire Protection Facts

Fire requires four components:

- *Fuel* such as wood, paper, or petroleum.
- *Heat*, which triggers the fire and raises the temperature of surrounding materials, bringing them closer to a combustible point.
- *Oxygen* for the oxidation of the combustible material.
- The *chemical reaction* that occurs as the oxygen and the fuel ignite.

Products produced by fire combustion include water, carbon dioxide (CO_2), smoke, and heat. Each of these byproducts can cause damage to computer systems.

Two primary fire suppression systems include:

Type	Description
Portable	Portable systems are fire extinguishers that can be used to suppress small fires. Be aware of the following facts when using a portable fire extinguisher: ▪ A pin is inserted in the handle of most fire extinguishers to prevent the extinguisher from being accidentally triggered. Remove the pin to use the fire extinguisher ▪ Use the PASS method (Pull, Aim, Squeeze, and Sweep) to administer the fire suppressant. Aim toward the base of the fire. ▪ Fire extinguishers usually have a limited effective range of 3–8 feet. ▪ Be aware that fires spread quickly. In most cases, you will be unable to control a fire with just a portable system.

Fixed	A fixed system is part of a building and typically combines fire detectors with fire-suppression technology.
	▪ Fire detectors detect rapid changes in temperature or smoke.
	▪ Fixed fire suppression systems usually use water or gas to extinguish fire.
	  ▪ Deluge sprinklers have open sprinklers, and the pipes are dry until the fire alarm causes the deluge valve to open and send water to all the sprinklers.
	  ▪ Wet pipe sprinklers contain pressurized water that is released when initiated by a heat-sensitive device. Wet pipe systems respond to fire threats more quickly than deluge systems.
	Be aware that a fixed system might only slow down a fire, giving you extra time to evacuate; it might be incapable of actually extinguishing a fire.

Extinguishing agents used to suppress fire include:

- Water to remove the heat. Water can cause damage to computer equipment, but it is harmless to people.
- Gas to displace oxygen. When extinguishing a fire around critical computer equipment, the best option is to eliminate oxygen because that would have the least damaging effect. This task almost always involves a gas (such as CO_2 and Halon) that does not leave a damaging residue. Be aware of the following when using gas systems:
  - They don't work well in an open environment. and special ventilation may be required.
  - Evacuate the room immediately; removal of oxygen can suffocate someone in the room.
- Dry chemicals (such as sodium bicarbonate), wet chemicals, and foam can be used to extinguish fuel from burning, but will leave a residue and cause damage to the computer equipment.

The type of fire extinguisher you select should be based on the type of fire that is likely to occur in the area. The following table lists various U.S. fire classes and the appropriate suppressant type.

Class	Fuel Type	Suppressant Type
Class A	Wood, paper, cloth, plastics	Water or soda acid
Class B	Petroleum, oil, solvent, alcohol	CO_2 or FM200
Class C	Electrical equipment, circuits, wires	Halon or CO_2
Class D	Sodium, potassium	Dry powders
Class K	Oil, solvents, electrical wires	Halon, CO_2, soda acid

Multipurpose extinguishers can combine ratings such an A-B, B-C, ABC.

Be aware of the following facts regarding responding to fire emergencies:

- When a fire occurs, the first action is to ensure the safety of the people and evacuate the area.
- In most cases, you should not attempt to put out a fire yourself. Fires spread quickly and become out of control, placing you in danger.
- Never go back into a burning building to retrieve data or computer systems. Performing regular backups and storing media offsite before the emergency is the best way to protect valuable data.
- Education is key to proper response in the event of an emergency. Be sure to train employees that fire moves quickly and there is little time to waste to ensure safety and protect assets.
- CO_2 suppresses fire by eliminating oxygen. In addition to smothering fires, CO_2 is toxic to humans. If you use CO_2 to suppress a fire, you must evacuate the area and exhibit extreme caution.
- Inspect fire extinguishers regularly for proper pressure.
- Face the fire. Do not turn from it; back away from it instead.
- Never reuse a fire extinguisher. It could have inadequate pressure, or the nozzle could become clogged. It is usually less expensive to simply purchase a new fire extinguisher.
