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Technical Topic

Smoke & Carbon Monoxide Detectors – General Information

Smoke and carbon monoxide (CO) detectors are vital safety devices in residential homes, providing early warning for potentially life-threatening situations. Understanding how these detectors work, maintaining them properly, and knowing what actions to take when they sound an alarm can help protect your home and family. This bulletin outlines the operational principles of both types of detectors, the necessary maintenance steps, and what to do when the alarms go off.

How Smoke Detectors Work

Smoke detectors are designed to detect the presence of smoke, which can indicate a fire in the home. There are two main types of smoke detectors:

1. Ionization Smoke Detectors
   - **Operation:** These detectors contain a small amount of radioactive material that ionizes the air in the detector's sensing chamber. This creates a flow of ions (electric charge). When smoke enters the chamber, it disrupts the ion flow, causing the alarm to trigger.
   - **Best for:** Quickly detecting fast, flaming fires that produce small particles of smoke.
2. Photoelectric Smoke Detectors
   - **Operation:** These use a light-emitting diode (LED) and a light sensor inside the detector. When smoke particles enter the sensing chamber, they scatter the light, triggering the sensor to activate the alarm.
   - **Best for:** Detecting slow-burning fires that produce larger, visible smoke particles (like those from a smoldering mattress or furniture).

Some smoke detectors combine both technologies to offer more reliable fire detection. Newly constructed homes require that all smoke/carbon monoxide detectors be wired directly with a battery backup. All alarms will act in unison when smoke or CO2 is detected.

How Carbon Monoxide (CO) Detectors Work

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas that can be extremely dangerous in high concentrations. CO detectors are designed to alert you when unsafe levels of CO are detected in the air.

1. Electrochemical CO Detectors
   - **Operation:** These detectors contain electrodes that react with CO in the air, producing a small electrical current. The current is measured and, when CO levels reach a certain threshold, the alarm sounds.
   - **Best for:** Detecting low levels of CO over extended periods.
2. Metal Oxide Semiconductor (MOS) Detectors
   - **Operation:** These use a sensor with a metal oxide surface that changes resistance when exposed to CO. The change in resistance is detected, triggering the alarm when CO levels become dangerous.
   - **Best for:** Reliable CO detection in typical residential settings.

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Smoke & Carbon Monoxide Detectors Continued

Routine Maintenance for Smoke & Carbon Monoxide Detectors

Your smoke detectors and carbon monoxide detectors require regular maintenance. To ensure they remain effective follow these simple maintenance steps:

Proper Placement

Install detectors near sleeping areas on each level of the home, ensuring they are clear of any obstructions. Avoid placing them near windows or vents, as drafts can interfere with proper detection.

Test Monthly

Press the test button on your detectors once a month. If the alarm sounds, the detector is working properly. If it doesn't, the detector may need maintenance or replacement.

Clean Every 6 Months

Dust and debris can affect the detector's sensitivity. Gently vacuum the detectors with a soft brush attachment or wipe it with a dry cloth every 6 months. Avoid using cleaning sprays or harsh chemicals.

Change Batteries Annually

Replace the batteries annually or as recommended by the manufacturer. Even detectors with long-life batteries should be tested and checked regularly.

Replace Every 7-10 Years

Smoke detectors typically last about 10 years, while CO detectors need to be replaced every 7 to 10 years due to sensor degradation. Always refer to the manufacturer's recommendations for accurate timing.

What to Do When the Alarm Sounds

When either your smoke or CO detector sounds an alarm, it is crucial to take immediate and appropriate action. Here's what to do:

SMOKE DETECTORS

- ☑ **Stay Calm**
  Quickly assess the situation. Don't panic, but act quickly.
- ☑ **Check for Signs of Fire**
  If there is visible smoke or fire, evacuate immediately. Use the nearest exit.
- ☑ **Evacuate Safely**
  Leave the house immediately, ensuring all family members and pets are accounted for.
- ☑ **Call Emergency Services**
  Dial your local emergency number to report the fire. Do not re-enter the building until it has been cleared by authorities.
- ☑ **If No Visible Fire or Smoke**
  If there is no fire or smoke and the alarm stops, it may have been triggered by dust, steam, or cooking fumes. Check the detector for cleanliness, and reset it.

CARBON MONOXIDE DETECTORS

- ☑ **Evacuate the Premises**
  Carbon monoxide is colorless and odorless. If the CO detector alarm sounds, immediately evacuate everyone in the house.
- ☑ **Call Emergency Services**
  Report that your CO detector is sounding. Emergency responders will have the tools to measure CO levels.
- ☑ **Do Not Re-enter the Home**
  Once evacuated, do not re-enter the home until emergency services have confirmed it is safe. CO poisoning can be fatal.
- ☑ **Ventilate the Area**
  ONLY if you are not at risk of CO exposure, open windows and doors to ventilate the area to reduce CO levels.
- ☑ **Identify Potential CO Sources**
  Once the immediate danger is cleared, have a qualified technician inspect appliances that may be producing CO (e.g., gas heaters, stoves, water heaters, or furnaces).

Both smoke and carbon monoxide detectors are essential for home safety, alerting you to potential dangers early enough to act. Regular maintenance ensures that these devices will function properly when needed most. Testing them monthly, replacing batteries regularly, and keeping them clean can prevent malfunctions. Moreover, understanding what to do when an alarm sounds.