

# IONIZATION AND PHOTOELECTRIC SMOKE ALARMS

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## Do you know the difference in Ionization and a Photoelectric Smoke Alarms?

### References:

NFPA.org

NIST: Performance of Home Smoke Alarms: Analysis of the Response of Several Available Technologies in Residential Fire Settings

NFPA 72 Task Group Report on Smoke Detection Technology

NFPA 72 National Fire Alarm and Signaling Code

1. Define an Ionization Smoke Alarm.
  - a. Uses a small amount of radioactive material to ionize air in the sensing chamber.
  - b. Air chamber becomes conductive permitting current to flow between two charged electrodes.
  - c. When products of combustion enter the chamber, the conductivity of the chamber air decreases.
  - d. When reduction in conductivity is reduced to a predetermined level, the alarm is set off.
  - e. Most smoke alarms in residences are of this type.
2. Define a photoelectric type smoke alarm.
  - a. Consists of a light emitting diode and a light sensitive sensor in the sensing chamber.
  - b. The presence of suspended products of combustion in the chamber scatters the light beam.
  - c. Scattered light is detected and sets off the alarm.
3. The two types of alarms operate on different principles and therefore may respond differently to various conditions.
4. Ionization sensors may respond slightly faster to flaming fires, whereas photoelectric sensors may respond slightly faster to smoldering fires. Both alarms must be tested to the same standard and meet the same requirements. Since you can't predict the type of fire that will occur, installing both types of alarms in your home can enhance fire safety.

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## Do you know the difference in Ionization and a Photoelectric Smoke Alarms?

5. Ionization models are best suited for rooms that contain highly combustible materials that can create flaming fires. These types of materials include flammable liquids, newspapers, and paint cleaning solutions.
6. Photoelectric models are best suited for living rooms, bedrooms and kitchens This is because these rooms often contain large pieces of furniture, such as sofas, chairs, mattresses, counter tops, etc. which will burn slowly and create more smoldering smoke than flames.
7. Any smoke alarm technology, to be acceptable, must perform acceptably for both types of fires in order to provide early warning of fire at all times of the day or night and whether you are asleep or awake.
8. The best evidence has always indicated that either type of smoke alarm will provide sufficient time for escape for most people for most fires of either smoldering or flaming type. However, for best protection, use both types of smoke alarm technologies.
9. In addition to individual ionization and photoelectric alarms, combination alarms that include both technologies in a single device are available.