



## Smoke Detectors

Smoke detectors are a common household item. One type, ionization smoke detectors, use a small radioactive source as a key component in detecting smoke particles. Photoelectric smoke detectors, use a light and sensor to detect smoke. Ionization smoke detectors are more effective at detecting flash fires, while photoelectric smoke detectors are more effective in detecting smoldering fires. Both cost about the same, and many smoke detector models use both ionization and photoelectric features, to achieve maximum detection.

The radionuclide used in ionization smoke detectors is an oxide of americium-241, which is bonded to a metallic foil and sealed in an ionization chamber. As long as you use the smoke detector as directed and do not open it, it poses no radiation health risk to humans--always use a smoke detector in your home.

Americium-241 is a man-made radioactive metal, first discovered during the Manhattan project, the national program that first developed atomic weapons during World War II. Americium-241 emits alpha particles and low-energy gamma rays. The smoke detector alarm goes off when the flow of alpha particles is interrupted by smoke particles.

## Who is protecting you

### The States

Each state has one or more programs that address radiation protection and the use and disposal of radioactive material in consumer products.

### U.S. Nuclear Regulatory Commission (NRC)

NRC establishes regulations for the licensing of the sale, use and disposal of radioactive material. The requirements for a license for the use of radioactive material in a consumer product are based on the quantity of the radioactive material and the specified level of radiation.

### U.S. Environmental Protection Agency (EPA)

EPA's Clean Materials program is designed to monitor the ways radioactive sources enter the environment or the nation's metal supply through improper management. EPA also works with the National Conference of Radiation Control Program Directors to develop ways to keep unnecessary radioactive material out of consumer products.

## What you can do to protect yourself

- Use a smoke detector in your home. It can save your life.
- Never tamper with an ionization smoke detector or attempt to remove the americium.
- Replace the batteries in your smoke detector every year or as directed. Most detectors are certified for a useful life of ten years.
- Return outdated ionization smoke detectors, minus the batteries, to the manufacturer. The address of the manufacturer usually can be found on the back of the smoke detector. Most communities have a separate recycling program for batteries.

## Resources

You can explore this radiation source further through the resources at the following URL:

<http://www.epa.gov/radtown/smoke-detector.html#resources>

We provide these resources on-line rather than here so we can keep the links up-to-date.