



# HEALTH PHYSICS SOCIETY

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*Specialists in Radiation Safety*

## CONSUMER PRODUCTS CONTAINING RADIOACTIVE MATERIALS

### HEALTH PHYSICS SOCIETY FACT SHEET

Everything we encounter in our daily lives contains some radioactive material, some naturally occurring and some man-made: the air we breathe, the water we drink, the food we eat, the ground we walk upon, and the consumer products we purchase and use. Although they might be familiar with the use of radiation to diagnose disease and treat cancer, many people, when they hear the terms “radioactive” and “radiation,” tend to think of mushroom clouds and the monster mutants that inhabit the world of science fiction movies and comic books. Careful analyses can identify and quantify the radioactive material in just about anything. This document describes a few of the more commonly encountered and familiar consumer products that can contain sufficient radioactive material for it to be distinguished from background with a simple handheld radiation survey meter.

**Smoke Detectors.** Most residential smoke detectors contain a low-activity americium-241 source. Alpha particles emitted by the americium ionize the air, making the air conductive. Any smoke particles that enter the unit reduce the current and set off an alarm. Despite the fact that these devices save lives, the question “are smoke detectors safe?” is still asked by those with an inordinate fear of radiation. The answer, of course, is “yes, they are safe.” Instructions for proper installation, handling, and disposal of smoke detectors are found on the package.

**Watches and Clocks.** Modern watches and clocks sometimes use a small quantity of hydrogen-3 (tritium) or promethium-147 as a source of light. Older (for example, pre-1970) watches and clocks used radium-226 as a source of light. If these older timepieces are opened and the dial or hands handled, some of the radium could be picked up and possibly ingested. As such, caution should be exercised when handling these items.

**Ceramics.** Ceramic materials (for example, tiles, pottery) often contain elevated levels of naturally occurring uranium, thorium, and/or potassium. In many cases, the activity is concentrated in the glaze. Unless there is a large quantity of the material, readings above background are unlikely. Nevertheless, some older (for example, pre-1960) tiles and pottery, especially those with an orange-red glaze (for example, Fiesta® ware) can be quite radioactive.

**Glass.** Glassware, especially antique glassware with a yellow or greenish color, can contain easily detectable quantities of uranium. Such uranium-containing glass is often referred to as canary or vaseline glass. In part, collectors like uranium glass for the attractive glow that is produced when the glass is exposed to a black light. Even ordinary glass can contain high-enough levels of potassium-40 or thorium-232 to be detectable with a survey instrument. Older camera lenses (1950s-1970s) often employed coatings of thorium-232 to alter the index of refraction.

**Fertilizer.** Commercial fertilizers are designed to provide varying levels of potassium, phosphorous, and nitrogen. Such fertilizers can be measurably radioactive for two reasons: potassium is naturally radioactive, and the phosphorous can be derived from phosphate ore that contains elevated levels of uranium.

**Food.** Food contains a variety of different types and amounts of naturally occurring radioactive materials. Although the relatively small quantities of food in the home contain too little radioactivity for the latter to be readily detectable, bulk shipments of food have been known to set off the alarms of radiation monitors at border crossings. One exception would be low-sodium salt substitutes that often contain enough potassium-40 to double the background count rate of a radiation detector.

**Gas Lantern Mantles.** While it is less common than it once was, some brands of gas lantern mantles incorporate thorium-232. In fact it is the heating of the thorium by the burning gas that is responsible for the emission of light. Such

mantles are sufficiently radioactive that they are often used as a check source for radiation detectors.

**Antique Radioactive Curative Claims.** In the past, primarily 1920 through 1950, a wide range of radioactive products were sold as cure-alls, for example, radium-containing pills, pads, solutions, and devices designed to add radon to drinking water. The states generally have regulatory authority over these devices. In some cases, a state might even require that these devices be registered or licensed. Most such devices are relatively harmless but occasionally one can be encountered that contains potentially hazardous levels of radium. If there is any question about the safety of such devices, the public is strongly encouraged to contact the state radiation-control program for advice.

**For further information contact the following:**

National Council on Radiation Protection and Measurements, "Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources," NCRP Report No. 95, Bethesda, MD, 1987.

U.S. Nuclear Regulatory Commission, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials," NUREG-1717, Washington, DC, 2001. (This report is currently available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/>.)

The Health Physics Society Web site (<http://www.hps.org>) contains a wealth of information about radiation and radioactivity, including an "Ask the Experts" feature where specific questions about radiation and radioactivity will be answered.

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The Health Physics Society is a nonprofit scientific professional organization whose mission is excellence in the science and practice of radiation safety. Since its formation in 1956, the Society has grown to approximately 6,000 scientists, physicians, engineers, lawyers, and other professionals representing academia, industry, government, national laboratories, the Department of Defense, and other organizations. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. Official position statements are prepared and adopted in accordance with standard policies and procedures of the Society. The Society may be contacted at 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101; phone: 703-790-1745; fax: 703-790-2672; email: [hps@burkinc.com](mailto:hps@burkinc.com).