



## RADIUM-226 AND 228

### What is Radium-226 and 228?

Radium is a silvery-white metal that is radioactive. It sends out energy in the form of rays, waves, or particles. It is found in nature and can exist in several forms. Radium forms when two other chemicals (uranium and thorium) break down in most rocks and soil.

Radium will undergo radioactive decay. During the decay process, alpha, beta, and gamma radiation are released. Alpha particles can travel only a short distance and cannot travel through skin. Beta particles can go through your skin, but they cannot go through your body. Gamma radiation can go through the body.

### Where can radium 226- and 228 be found and how are they used?

Radium is always being made by the radioactive decay of uranium and thorium. Since radium is present at low levels in rocks and soil, it can strongly attach to those materials. It can also be found in air. In some parts of the country, high levels of radium are found in water. When uranium is mined, higher levels of radium are found in nearby water. Radium in the soil may be taken in by plants. It can also build up in fish and other forms of life found in water.

When radium was first discovered in the early 1900s, no one knew that it was dangerous. It was used to produce many products and to treat cancer. Today, most of those uses have ended for health and safety reasons. Radium is still used in some industrial devices and for research.

### How can people be exposed to radium 226- and 228?

You could be exposed to radium through:

- **Breathing** it in the air. Everyone is exposed to low levels of radium in the air. When factories burn coal or other fuels, radium can enter the air and people can be exposed to it.
- **Drinking** it in water. The amount of radium in drinking water is usually low. It may be found in higher levels in drinking water from wells. In some areas of the United States, higher amounts of radium are found in the water due to the earth's natural structure.
- **Touching** it at worksites. Miners who work with uranium and hard rock can be exposed to higher levels of radium. It can also be found at radioactive waste disposal sites.

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## **How does radium 226- and 228 work?**

If you breathe radium into your lungs, it can stay there for months. It will slowly enter the blood and be taken to all parts of the body. The bones will be most affected. For months after exposure, small amounts will leave the body every day through urine and waste matter.

If radium is swallowed in water or with food, most of it will quickly leave the body as waste matter. Some will enter the blood and be taken to all parts of the body, mostly to the bones. Small amounts will leave the body every day through waste matter.

## **How can radium 226- and 228 affect my health?**

Low levels of radium in nature are normal. No data shows that long-term exposure to low levels is harmful.

Radium is a known cancer-causing substance. Exposure to high levels of radium can lead to higher chances of bone, liver, and breast cancer. Exposure to high levels of radium over a long period can lead to death and other severe health problems: anemia, a problem with the blood; fractured teeth and cavities, and growths in the eyes called cataracts. Some of these health problems take years to develop. Most are due to gamma radiation, which can travel a long way through the air. Just being near high levels of radium is dangerous.

## **How is radium 226- and 228 exposure treated?**

There are no specific treatments for radium poisoning. Decontaminating the exposed person and their clothing is essential to remove radiation. All clothing is removed and the patient's entire skin surface is scrubbed with soap and water. Clothing, along with soap, wastewater, and towels, should be placed in a sealed container and labeled as radioactive waste.

If the person has taken radiation into the body, special agents will help remove the radiation from the bloodstream. Other agents can prevent radiation from entering the tissues and allow the radiation to be discharged through urine.

## **What should I do if exposed to radium 226- and 228?**

All work sites and medical facilities should have procedures in place to handle exposure to radiation. If you are exposed to radiation, decontamination should begin immediately. Emergency workers should first protect themselves with proper gear. The exposed person's clothing should be removed. Then, the entire skin surface must be scrubbed with soap and water. Clothing, along with soap, wastewater, and towels, should be placed in a sealed container and labeled as radioactive waste.

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It is important to determine the exact type of exposure to help emergency workers and doctors provide the best treatment. It will also help protect the hospital staff.

### **What factors limit use or exposure to radium 226- and 228?**

The best way to protect yourself and your family is to test your home for radon. Radon is produced when radium decays. Hazardous waste sites may contain radium. If you live near one, do not touch soil that contacted radium. Do not breathe dust that is contaminated by radium.

### **Is there a medical test to show whether I was exposed to radium 226- and 228?**

A urine test can show if you were exposed to radioactivity. There is also a test to measure the amount of radon, a breakdown product of radium, that you exhale, or breathe out. Another test for special cases of high exposure can measure the total amount of radioactivity in the body. These tests cannot tell what the harmful effects of exposure might be.

### **Technical information for radium 226- and 228**

CAS Number: 7440-14-4

Chemical Formula: Ra-226 or <sup>226</sup>Ra and Ra-228 or <sup>228</sup>Ra

Carcinogenicity (EPA): Known carcinogen.

MCL (Drinking Water): 5 picocuries per liter (5 pCi/L)

OSHA Standards: No standards specifically for radium.

NIOSH: No standards specifically for radium.

### **Resources**

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. *Toxicological profile for radium*. Atlanta, GA: U.S. Department of Health and Human Services.  
<https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=791&tid=154>

eMedicine, CBBRNE: Radiation Emergencies,  
<http://www.emedicine.com/emerg/topic934.htm>

U.S. Environmental Protection Agency, Technology Transfer Network,  
<http://www.epa.gov/ttn/atw/hlthef/radionuc.html>

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