



RADIOISOTOPE BRIEF

Cobalt-60 (Co-60)

Half-life: 5.27 years

Mode of decay: Beta particles and gamma radiation

Chemical properties: Metallic solid that can become magnetically charged

What is it used for?

Co-60 is used medically for radiation therapy as implants and as an external source of radiation exposure. It is used industrially in leveling gauges and to x-ray welding seams and other structural elements to detect flaws. Co-60 also is used for food irradiation, a sterilization process.

Where does it come from?

Nonradioactive cobalt occurs naturally in various minerals and has long been used as a blue coloring agent for ceramic and glass. Radioactive Co-60 is produced commercially through linear acceleration for use in medicine and industry. Co-60 also is a byproduct of nuclear reactor operations, when metal structures, such as steel rods, are exposed to neutron radiation.

What form is it in?

Co-60 occurs as a solid material and might appear as small metal disks or in a tube, enclosed at both ends, that holds the small disks. Co-60 can occur as a powder if the solid sources have been ground or damaged.

What does it look like?

Co-60 is a hard, gray-blue metal. It resembles iron or nickel.

How can it hurt me?

Because it decays by gamma radiation, external exposure to large sources of Co-60 can cause skin burns, acute radiation sickness, or death. Most Co-60 that is ingested is excreted in the feces; however, a small amount is absorbed by the liver, kidneys, and bones. Co-60 absorbed by the liver, kidneys, or bone tissue can cause cancer because of exposure to the gamma radiation.

Beta particles: electrons ejected from the nucleus of a decaying atom. Although they can be stopped by a thin sheet of aluminum, beta particles can penetrate the dead skin layer, potentially causing burns. They can pose a serious direct or external radiation threat and can be lethal depending on the amount received. They also pose a serious internal radiation threat if beta-emitting atoms are ingested or inhaled.

Gamma radiation: high-energy electromagnetic radiation emitted by certain radionuclides when their nuclei transition from a higher to a lower energy state. These rays have high energy and a short wave length. Gamma rays penetrate tissue farther than do beta or alpha particles, but leave a lower concentration of ions in their path to potentially cause cell damage. Gamma rays are very similar to x-rays.

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For more information about Co-60, see the Public Health Statement by the Agency for Toxic Substances and Disease Registry at <http://www.atsdr.cdc.gov/toxprofiles>, or visit the Environmental Protection Agency at <http://www.epa.gov/radiation/radionuclides/cobalt.htm>.

For more information about health effects related to radiation exposure, see CDC's fact sheet on "Radiation and Health Effects," at <http://www.bt.cdc.gov/radiation/healthfacts.asp>.

For more information on protecting yourself before or during a radiologic emergency, see CDC's fact sheet titled "Frequently Asked Questions (FAQs) About a Radiation Emergency" at <http://www.bt.cdc.gov/radiation/emergencyfaq.asp>, and "Sheltering in Place During a Radiation Emergency," at <http://www.bt.cdc.gov/radiation/shelter.asp>.

The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.

For information on other radiation emergency topics,
visit www.bt.cdc.gov/radiation, or call the CDC public response hotline
at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)