RADIOISOTOPE BRIEF

# Cobalt-60 (Co-60)

**Half-life** (http://www.bt.cdc.gov/radiation/glossary.asp#h): 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 (http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodirradiation.htm), 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.

***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.

## 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 (http://www.bt.cdc.gov/radiation/glossary.asp#externalexposure) to large sources of Co-60 can cause skin burns, acute radiation sickness (http://www.bt.cdc.gov/radiation/glossary.asp#ars), 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.



DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
SAFER • HEALTHIER • PEOPLE™

(continued from previous page)

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 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 more information, visit www.bt.cdc.gov/radiation, or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).



DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
SAFER • HEALTHIER • PEOPLE™