Safety Data Sheet for Radium-226

FACT SHEET 26-017-0617

Section 1: Identification - Radium-226 (Ra-226, ^{226}Ra)

Section 2: Hazard Identification - Radium-226 can present an internal and external radiation hazard. Solid sources of radium-226 pose little external hazard, but decay products of radium-226 such as radium-222 can be a slight external hazard. Liquid or gas sources of radium-226 can be an internal and external hazard.

Section 3: Composition/Information on Ingredients – The half-life of radium-226 is 1622 years. Radium-226 emits alpha particles that can travel about 6.5 centimeters. It also emits low-energy gamma radiation.

Section 4: First-aid Measures – In the event of skin contact, wash with soap and water. Blot the skin dry; do not scrub as doing so may damage the skin. For inhalation or ingestion, cover mouth while seeking clean air. Contact medical professionals for guidance on how to remove materials from the body and to properly assess dose received.

Section 5: Fire-fighting Measures – A self-contained breathing apparatus used by fire fighters is sufficient for preventing inhalation; decontaminate after retreating from the source.

Section 6: Accidental Release Measures - Gas and liquid forms of radium-226 should only be used in HEPA filtered fume hoods. If a capsule or vial that contains radium-226 is broken, secure the room or area to prevent exposure or contamination. Contact you Safety office, Radiation Safety Officer, and the Health Physics Division at the Army Public Health Center for further guidance.

Section 7: Handling and Storage - Radium-226 should be stored in areas approved by a radiation safety officer and labelled appropriately. Personnel who handle it should have radiation safety training. Food or beverages should not be consumed where radium-226 is used. Store items that contain radium-226 in a dry, well-ventilated place. The AN/PDR-77 RADIAC set can detect radium-226 with a pancake probe or an alpha probe. These probes effectively indicate presence/absence, and they can detect contamination.

Section 8: Exposure Controls/Personal Protection - Radium-226 should be handled as little as possible. This source should be kept as far away from the body as is practical.

Section 9: Physical and Chemical Properties - Radium-226 can be found in such medical devices as teletherapy units and brachytherapy needles. It can also be found as paint on clock dials and on gauges in tanks and aircraft. All of these sources are solid and pose no internal hazard as long as they are not damaged. Radium-226 is the source of radon-222. Radon-222 is a radioactive inert gas that can collect in areas with limited ventilation, such as basements and mines.

Section 10: Stability and Reactivity – Radium is very reactive with most non-metals, including oxygen, fluorine, chlorine, and nitrogen. Chemical reactions with any isotope of radium may result in radium gas, which can be an inhalation hazard.

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Section 11: Toxicological Information -

High-energy short-lived daughter products: radon-222, polonium-218, astatine-218, radon-218, bismuth-214, polonium-214, thallium-214, lead-210, bismuth-210, polonium-210.
Specific Activity: 1.0 Ci/g
Dose, ingestion: 2.8E-7 Sv/Bq (f_1 = 0.2)
Dose, inhalation: 3.6E-7 Sv/Bq (Type F, f_1 = 0.3)
3.5E-6 Sv/Bq (Type M, f_1 = 0.1)
9.5E-6 Sv/Bq (Type S, f_1 = 0.01)
Gamma Constant: 3.274E-6 mSv h^{-1} per MBq at 1 meter (Does not include progeny)
***For more information, see "Health Physics and Radiological Health, 4th Edition" by Thomas** E. Johnson and Brian K. Birky, (Lippincott Williams & Wilkins, 2012)*

Section 12: Ecological Information - None

Section 13: Disposal Considerations - Radioactive materials cannot be disposed of as regular trash. The US Army Joint Munitions Command manages the disposal of radioactive materials in the Army. Contact the radiation waste experts at Rock Island Arsenal Garrison for radioactive disposal from contact numbers found at https://www.usagria.army.mil/about/phonebook.aspx .

Section 14: Transportation Information - When shipping radioactive materials, consult 49 CFR (Code of Federal Regulations) 173 for instructions. Packaging and shipping radioactive materials requires Department of Transportation certified training.

Section 15: Regulatory Information – 10 CFR is the federal regulation for use, storage, and disposal of licensed radioactive materials under U.S. Nuclear Regulatory Commission jurisdiction.

Section 16: Other Information - Contact your command Safety office or the Health Physics Division at Army Public Health Center (410-436-3502) for more information on regulations or emergencies relating to use of radioactive materials in the U.S. Army.