



## Canadian Nuclear Safety Commission Radiation Safety Data Sheet

This data sheet presents information on radioisotopes only.

For information on chemical compounds incorporating this radionuclide, see the relevant Material Safety Data Sheet.

### Part 1 - RADIOACTIVE MATERIAL IDENTIFICATION

Chemical Symbol:	Ca	Common Names:	Calcium
Atomic Weight:	45	Atomic Number:	20

### Part 2 - RADIATION CHARACTERISTICS

<b>Physical Half-Life:</b>	163 days	
<b>Unconditional Clearance Levels:</b>	Activity Concentration (Bq/g)	$1 \times 10^2$
<b>CNSC Exemption Quantity:</b>	Activity Concentration (Bq/g)	$1 \times 10^4$
	Activity (Bq)	$1 \times 10^7$

Principal Emissions	Average Energy of Most Abundant Emission (MeV)	Maximum Energy of Most Abundant Emission (MeV)	Gamma-Ray Dose Rate at 1m Distance (mSv/h per GBq) <sup>1</sup>	Shielding Information <sup>2</sup>
Neutrons	-	-	-	-
Gamma & X-ray	0.01247	-	$8 \times 10^{-9}$	-
Beta & Electrons*	0.07723	0.257	-	Total absorption: 0.3 mm glass or 0.6 mm plastic
Alpha	-	-	-	-

\* Where beta radiation is present, bremsstrahlung radiation will be produced. Shielding for bremsstrahlung radiation must be considered.

<sup>1</sup>Unger, L. M. and Trubey, D. K., Specific Gamma-Ray Dose Constants for Nuclides Important to Dosimetry and Radiological Assessment, September 1981.

<sup>2</sup>Delacroix, D. et al, Radionuclide and Radiation Protection Data Handbook 2002.

<b>Progeny</b>	
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### Part 3 - DETECTION AND MEASUREMENT

**Recommended Method of Detection:**

Beta probe (e.g., thin-window Geiger-Mueller detector)

**Dosimetry:**

External: TLD (whole body & skin)  Extremity  Neutron   
 Internal: Whole body  Thyroid  Urine analysis  Other (specify)  Feces

### Part 4 - PREVENTATIVE MEASURES

Calcium-45 is considered highly radiotoxic because of its affinity for the bone. Radiocalcium has a long biological half-life and can cause damage to the blood forming organs. Calcium reacts with water, producing hydrogen. If concentrated, the gas becomes a fire and explosion hazard. Calcium also poses a fire and explosion hazard when heated or when in contact with strong oxidizing agents.

Recommended protective clothing: No protective clothing is necessary for work with sealed sources. When working with unsealed sources wear appropriate protective clothing, such as laboratory coats, coveralls, gloves, and safety glasses/goggles. Laboratory coats must be monitored before leaving the laboratory. Use a suitable mask if the radioactive material is in the form of a dust, powder or if it is volatile.

Optimize time, distance, shielding. Use disposable absorbent liners on trays.

Consult CNSC license for requirements concerning engineering controls, protective equipment, and special storage requirements.

### Part 5 - ANNUAL LIMIT ON INTAKE

	Ingestion	Inhalation
Compound Type	All compounds	All compounds
Annual Limit on Intake (Bq)	$2.6 \times 10^7$	$8.7 \times 10^6$



## EMERGENCY PROCEDURES

The following is a guide for first responders. The following actions, including remediation, should be carried out by qualified individuals. In cases where life threatening injury has resulted, **first** treat the injury, **second** deal with personal decontamination. In the case of an emergency, the Radiation Safety Officer should be contacted as soon as practicable.

### Personal Decontamination Techniques

- Wash well with soap and water and monitor skin
- Do Not abrade skin, only blot dry
- Decontamination of clothing and surfaces are covered under operating and emergency procedures

### Spill and Leak Control

- Alert everyone in the area
- Clear area
- Summon Aid

### Emergency Protective Equipment, Minimum Requirements

- Gloves
- Footwear Covers
- Safety Glasses
- Outer layer or easily removed protective clothing
- Suitable respirator selected

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