

## SAFETY DATA SHEET

### Physical Properties

Isotope:	Barium-133	Symbol:	Ba-133 or <sup>133</sup> Ba
Atomic Number:	56	Mass Number:	133 (77 neutrons)
Chemical Form:	Ceramic / metal barium matrix		
Physical Form:	Typically, a ceramic matrix encapsulated in steel		

### Radiological Characteristics

Half-life	10.5 years	Specific Activity	9460 GBq/g
Gamma-Factor	123 uSv/h per GBq @1m	Half Value Layer	2 mm lead
Security D value:	n/a		
Decays to:	Cs-133		

### Radiation Emitted

Radiation	Energy (MeV)
Beta	80 (86%)
	133 (14%)
Gamma	81 (34%)
	276 (7.2%)
	303 (18%)
	356 (62%)
	384 (8.9%)
X-ray	3-36 keV (122%)

### Hazard Identification

Ba-133 is a radioactive isotope. Radioactive materials are known to be carcinogenic. However, health risks are dependent on the type and nature of exposure to radioactive material and ionising radiation (that may be emitted from radioactive material).

Adverse health effects are possible from either internal or external exposure to radiation & radioactive material.

Tissue reaction effects (acute, deterministic effects) are only possible from exposure to large radiation doses.

Stochastic effects (chronic, long term), such as cancer, are possible from any radiation exposure, and risk is generally accepted to be 5% (chance of contracting a fatal cancer) from 1000 mSv of radiation exposure. In perspective, on average, an Australian is likely to receive an average of 1.5mSv of dose each year.

## First Aid Measures

In case of emergency, lifesaving rescue and first-aid measures should be taken. Rescue crew to be made aware of possible contact with radioactive material. Delayed effects can be expected after exposure.

Skin contact: Immediately decontaminate skin.

Ingestion: Induce vomiting to remove ingested material from the body.

## Emergency Procedures

This advice is for trained and competent radiological first responders.

Assess the nature and magnitude of the incident – is there damage to the package, device, or source itself? Consider the possibility of potential contamination.

In case of emergency, lifesaving rescue and first-aid measures should be taken. Rescue crew will be made aware of possible contact with radioactive material.

Notify the Responsible Person (owner), the Radiation Safety Officer, who will notify the relevant regulatory body. The response shall be in accordance with existing emergency response plans.

Establish a 5m exclusion zone and warning signage. If required, rescue personnel and administer first-aid as required.

General personal precautions & PPE:

- Obtain radiation survey meter and personal dosimeters (if possible)
- Keep unprotected people away.
- Avoid contact & handling of damaged material.
- Wear protective equipment (nitrile gloves, respiratory protection, safety glasses, consider Tyvec suit & footwear covers)

Personal decontamination (if required):

- Wash skin well with soap and water (decon-90 if available)
- Remove exposed clothing, if required
- Assess with contamination survey meter (if available)
- Do not scrub skin – dry blot only

Damaged source or leakage control:

- Confine package / device / source and protect from further damage – consider the use of absorbent materials
- Assess locality of drains, surface-water, groundwater and soft ground (soil, etc)
- Recovery of device/source to be considered carefully

## Firefighting:

- If necessary, SCBA (self-contained breathing apparatus) and full protective equipment are required.

## Storage and Transport

Transport shall only be performed by authorised and competent personnel - a licence for the transport of radioactive material is required in most jurisdictions.

During transport or while stored, radioactive material shall be appropriately segregated from:

- Other dangerous goods
- Food and food packaging
- Personnel (consider dose)
- Undeveloped photographic film

## Disposal Considerations

Disposal shall only be performed after consultation with the relevant radiological regulator. Use of a radiation service provider is recommended.

Typical disposal pathways include:

- Return to source (or device) manufacturer
- Transfer to another licensed user
- Transfer to an authorised radiation service provider (such as Radsol)
- In some jurisdictions (e.g., Western Australia), it is possible to transfer the source to an approved intractable waste disposal facility

## Disclaimer

Safety Data Sheets (SDS) are not generally required for radioactive materials.

Radsol has produced this SDS for use by clients, with the best available information at the time of production. Radsol makes no guarantee of the accuracy of the information contained herein.

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