Radioactive Material 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.

Cesium-137

Part 1 – Radioactive Material Identification

Common Names: Cesium-137 **Chemical Symbol:** Cs-137 or ^{137}Cs

Atomic Number: 55 **Mass Number:** 137 (82 neutrons)

Chemical Form: Cesium chloride **Physical Form:** A pellet of cesium ceramic housed in a welded stainless steel capsule

Part 2 – Radiation Characteristics

Physical half-life: 30.22 years **Specific Activity (GBq/g):** 3,220

Principle Emissions	E_{Max} (keV)	E_{eff} (keV)	Dose Rate (mSv/h/GBq at 1m)	Shielding Required
Beta* (β)	511 (94.6%)	157	-	-
Gamma (γ) / X-Rays	662 (89.9%)	-	103[a]	HVL Lead: 0.65 cm
Alpha (α)	-	-	-	-
Neutron (n)	-	-	-	-

* Where Beta radiation is present, Bremsstrahlung radiation will be produced. Shielding may be required.
Note: Only emissions with abundance greater than 10% are shown.
[a] *The Health Physics and Radiological Health Handbook,* Scintra, Inc., Revised Edition, 1992

Progeny: Barium-137m (Ba-137m)

Part 3 – Detection and Measurement

Methods of detection (in order of preference)

1. A radiation survey meter equipped with an energy-compensated Geiger Mueller detector.
2. Ion chamber survey meter – tends to be less sensitive than a Geiger Mueller survey meter but is able to respond more precisely in higher radiation fields.
3. Gamma scintillation detector – very sensitive but is also energy dependent. Must be calibrated for Cs-137 before it can be used for dose assessment surveys.

Dosimetry

Whole Body ☑	Skin ☐	Extremity ☐	Neutron ☐

Internal:	Sealed sources pose no internal radiation hazard. However, in the event of loss of containment by the sealed source, all precautions should be taken to prevent inhalation or ingestion of the material.	
Critical Organ(s):	None known at this time.	
Annual dose limits:	*Non-nuclear energy workers:*	1mSv per year
	Nuclear energy workers:	a) 50 mSv in one year
		b) 100 mSv total over five years
	Pregnant nuclear energy workers:	4 mSv over the balance of the pregnancy

Part 4 – Preventive Measures

Always use the principles of time, distance and shielding to minimize dose

Engineering Controls:	Sealed radioactive sources used in industrial applications should always be within a protective source housing to minimize radiation dose and to protect the source capsule from damage.
Personal Protective Equipment (*for normal handling of unsealed sources only. Always wear disposable gloves, safety glasses, personal protective equipment and clothing as appropriate to the material handled).* No special PPE required.	
Special Storage Requirements:	None

Part 5 – Control Levels

Oral Ingestion	Inhalation	
ALI (kBq)	ALI (kBq)	DAC (Bq/ml)
3700	7400	2.2×10^{-3}
Exemption Quantity (EQ):	10,000 Bq	

Part 6 – Non-Radiological Hazards

No potential health effects are known regarding non-radiological hazards associated with cesium. However, large oral doses of the material may cause gastrointestinal disturbances. Chronic effects are not known at this time.

OSHA Permissible Exposure Limit (PEL):

15 mg/m3 total dust, 5 mg/m3 respirable fraction for nuisance dusts

Part 7 - 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.*

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
- Confine the problem or emergency (includes the use of absorbent material)
- Clear area
- Summon Aid

Damage to Sealed Radioactive Source Holder

- Evacuate the immediate vicinity around the source holder
- Place a barrier at a safe distance from the source holder (min. 5 meters)
- Identify area as a radiation hazard
- Contact emergency number posted on local warning sign

Suggested Emergency Protective Equipment

- Gloves
- Footwear Covers
- Safety Glasses
- Outer layer or easily removed protective clothing (as situation requires)

Revision Date: December 17, 2001

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