

## Iron-55

### 1. Radioactive Material Identification

Common Names: Iron-55

Atomic Number: 26

Chemical Form: Soluble

Chemical Symbol: Fe-55 or  $^{55}\text{Fe}$

Mass Number: 55 (29 neutrons)

### 2. Radiation Characteristics

Physical half-life: 2.737 years

Specific Activity (TBq/g): 89.1

Principle Emissions	$E_{\text{Max}}$ (keV)	$E_{\text{eff}}$ (keV)	Dose Rate ( $\mu\text{Sv/h/GBq}$ at 1m)	Shielding Required
Beta* ( $\beta$ )	-	-	-	-
Gamma ( $\gamma$ ) / X-rays	6 (25%) 7 (3%)	5.2	-	-
Alpha ( $\alpha$ )	-	-	-	-
Neutron (n)	-	-	-	-

Progeny: Manganese-55, Mn-55

<b>3. Detection and Measurement</b>	
<b>Methods of detection (in order of preference):</b>	
1. Liquid Scintillation Counting is to be used when conducting wipe tests for analyzing contamination.	
<b>Dosimetry</b>	
Whole Body _____	Skin _____ Extremity _____ Neutron _____
Internal: In the event of loss of containment by the sealed source, all precautions should be taken to prevent inhalation or ingestion of the material. If intake is suspected, blood sample may be chemically processed to separate the iron and counted in a proportional counter.	
Critical Organ(s): Spleen, blood	
Annual Dose Limits: Non-radiation workers: 0.1 rem per year Radiation workers: 5 rem per year, 10 rem total over five years Pregnant radiation workers: 0.4 rem over the balance of the pregnancy	

<b>4. Preventative Measures</b>	
Engineering Controls: None	
Personal Protective Equipment: For normal handling of unsealed sources only. Always wear disposable gloves, safety glasses, and whatever personal protective equipment and clothing appropriate to the material handled.	
Special Storage Requirements: Store Fe-55 behind lead shielding, lead bricks may be necessary. Use tools to handle Fe-55 sources and contaminated objects; avoid direct hand contact.	

<b>5. Control Levels</b>		
<b>Oral Ingestion</b>	<b>Inhalation</b>	
ALI (kBq)	ALI (kBq)	DAC (Bq/ml)
14,800	11,100	0.0037
<b>Exemption Quantity (EQ):</b>	370,000,000	Bq

## 6. Non-radiological Hazards

Prolonged exposure to airborne particles may result in cell damage, with the potential for subsequent cancers.

OSHA Permissible Exposure Limit (PEL):  
0.1 mg/m<sup>3</sup>

## 7. Emergency Procedures

### Personal Decontamination Procedures

- Remove loose contamination. Use care to prevent the spread of contamination and be extra careful around wounds
- Wash contaminated areas. Use mild soap or detergent initially; use a mild abrasive soap for more persistent contamination
- Do not abrade skin, only blot dry

### Spill and Leak Control

- Alert everyone in the area
- Confine the problem or emergency (includes the use of absorbent material)
- Clear area
- Summon aid
- If a release of powdered or gaseous material, evacuate all personnel from room immediately and turn off any equipment that needs constant attention. Prevent others from entering the room.

### 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 (minimum 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)