

# <sup>55</sup>Fe

## Radioisotope Safety Data Sheet Iron 55

**Half life** 2.68 years

### Radiations emitted

Radiation	Energy, keV	Yield %
K $\alpha$ 1 X-ray	5.9	16.6
K $\alpha$ 2 X-ray	5.89	8.4
K $\beta$ 1 X-ray	6.49	2.2
K $\beta$ 3 X-ray	6.49	1.1
Auger electrons	5	61

### Safety precautions

<sup>55</sup>Fe is a very low energy X-ray emitter. In MBq amounts it presents only an internal hazard.

Standard laboratory PPE (gloves, lab coat, safety glasses) should be used to avoid skin contamination and ingestion.

### Radiotoxicity data

<sup>55</sup>Fe is classed in group 3b according to AS 2243.4. This implies a relatively low hazard rating although all iron compounds tend to be strongly retained in the body.

The Annual Limit on Intake by ingestion (ALI<sub>ing</sub>) is 61 MBq and the most restrictive inhalation limit (ALI)<sub>inhal</sub> is 22 MBq.

### Shielding

No shielding is required while using MBq amounts of <sup>55</sup>Fe.

### Licensing requirements

Under the 2010 *Regulation*, a licence is required for the possession of <sup>55</sup>Fe sources with concentrations of greater than 10 kBq per gram and with activities of 1 MBq or greater. A user licence is also required for any persons who use such sources for research purposes.

### Disposal data

The maximum concentration of <sup>55</sup>Fe in aqueous wastes released to a sewerage system is given in the 2010 Radiation Safety Regulation as 4.15 MBq per m<sup>3</sup> i.e. 4.15 kBq per litre.

The concentration of <sup>55</sup>Fe in solid wastes disposed of to either the general or pathology

waste streams must be less than 5 kBq per gram (5 MBq per kg) – i.e. half the concentration limit for licensing. Wastes containing <sup>55</sup>Fe should not be placed in a decay store as there will be no significant diminution in activity and accountability for the waste may be lost. Users should consult their RSO to determine the most appropriate method of waste disposal.

### Radiation detection and monitoring

The low energy X-rays from <sup>55</sup>Fe are very difficult to detect with anything other than a beryllium window thin crystal scintillation detector. However, liquid scintillation counting of surface wipes can be used to detect removable contamination. Such wipes should be taken at the completion of labelling operations or, if <sup>55</sup>Fe use is continuous, at least at weekly intervals.

There is no requirement for personal monitoring for <sup>55</sup>Fe users, nor are there any personal dosimeters capable of responding to energies this low.

### Laboratory requirements

Low level lab maximum activities

Bench: 7.4 MBq

Fume cupboard: 74 MBq

Medium level lab maximum activities

Bench: 20 MBq

Fume cupboard: 200 MBq

NB: While AS 2243.4 sets greater activity limits, the guidance activities are maximum amounts that should need to be used in most research projects. Should greater activities need to be used, the advice of the University Radiation Protection Adviser should be sought.