

⁵⁷Co

Radioisotope Safety Data Sheet

Cobalt 57

Half life 271.8 days

Radiations emitted

Radiation	Energy, keV	Yield %
Gamma ray	14	9
Gamma ray	122	86
Gamma ray	137	11
K X-rays	~6.4	56

Safety precautions

⁵⁷Co is a medium energy gamma ray emitter that presents a mainly external irradiation hazard.

Handling tools and standard laboratory PPE (gloves, lab coat, and safety glasses) should be used to minimise exposure.

Because of the relatively low gamma ray constant, shielding at a workstation will only be required where sources with activities greater than about 100 MBq are handled in an unshielded condition. Wastes stored in the laboratory containing more than about 10 MBq of ⁵⁷Co may require shielding with lead sheet. Wastes should be monitored with a survey meter to ensure radiation levels are acceptable.

NB radiation levels in controlled areas must not exceed 40 µSv per week, and in areas accessible to non-radiation workers, 10 µSv per week.

Radiotoxicity data

⁵⁷Co is classed as being of lower hazard (group 3b) according to AS 2243.4.

The Annual Limit on Intake by ingestion (ALI_{ing}) is 95 MBq and the most restrictive inhalation limit (ALI)_{inhal} is 21 MBq.

Dose rates

The gamma ray dose rate constant for ⁵⁷Co is 40.9 µSv/h/ GBq @ 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm⁻² 119 µSv h⁻¹

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 1.6 µSv h⁻¹

Shielding

Half value layer (HVL) is approximately 6mm of Pb and the Tenth Value layer (TVL) is approximately 18 mm of Pb.

NB Perspex workstation shielding offers no protection from ⁵⁷Co Gamma radiation.

Licensing requirements

Under the *Radiation Safety Regulation 2010*, a licence is required to possess ⁵⁷Co sources with concentrations equal to or greater than 100 Bq per gram and with activities of 1 MBq or greater.

In the University, individual user licences are required for persons who use licenceable sources for research purposes.

Disposal data

The maximum concentration of ⁵⁷Co in aqueous wastes released to a sewerage system is given in the 2010 Radiation Safety Regulation as 6.52 MBq per m³ i.e. 6.52 kBq per litre.

The concentration of ⁵⁷Co in solid wastes disposed of to either the general or pathology waste streams must be less than 50 Bq per gram (50 kBq per kg) – i.e. half the concentration limit for licensing.

Radiation detection and monitoring

A large diameter end window or pancake type GM tube contamination monitor is the most suitable type of meter for contamination control. TLD dosimeters are recommended for whole body personal monitoring. (For details see the Personal Radiation Monitoring Safety Guideline).

Laboratory requirements

Low level lab maximum activities

Bench: 4 MBq

Fume cupboard: 40 MBq

Medium level lab maximum activities

Bench: 10 MBq

Fume cupboard: 100 MB

An additional factor of 2 relaxation is allowed for compounds other than oxides, halides, hydroxides and nitrates.