^{35}S Radioisotope Safety Data Sheet Sulfur 35

Half life 87.5 days

Radiations emitted

Beta rays 168 keV max, 49 keV average yield 100%

Safety precautions

^{35}S is a low energy beta emitter that only presents an internal hazard. Perspex shielded workstations are not required because of the limited range of the beta rays in air. Handling tools and standard laboratory PPE (gloves, lab coat, safety glasses) should be used to avoid skin contamination.

Work areas and equipment should be monitored using a suitable survey meter.

In general, many sulfur compounds are slightly volatile and may create contamination problems unless carefully controlled. A fume cupboard should be used when handling volatile compounds or for processes that could produce aerosols. Inorganic forms are more hazardous in this respect.

Radiotoxicity data

^{35}S is classed as being of low to moderate hazard (group 3b for inorganic forms and group 4 for organically bound forms) according to AS 2243.4

The Annual Limit on Intake by ingestion (ALI_{ing}) is 26 MBq and the most restrictive inhalation limit $(ALI)_{inhal}$ is 15 MBq.

Dose rates

Beta dose rate to the basal skin cells from contamination of 1 kBq cm^{-2} = 354 µSv h^{-1}

Beta dose rate from a 1 kBq (0.05 ml) droplet on skin = 4.05 µSv h^{-1}

Shielding

Maximum range of ^{35}S beta radiation in air: 29 cm.

There is very low potential for bremsstrahlung production and Perspex shielding of workstations and waste containers is not necessary.

Licensing requirements

Under the *Radiation Safety Regulation* 2010**,** a licence is required for the possession of ^{35}S sources with concentrations of greater than or equal to 100 kBq per gram and with activities of 10 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 ^{35}S in aqueous wastes released to a sewerage system is given in the 2010 *Regulation* as 1.78 MBq per m^3 i.e. 1.78 kBq per litre.

The concentration of ^{35}S in solid wastes disposed of to either the general or pathology waste streams must be less than 50 kBq per gram (50 MBq per kg) – i.e. half the concentration limit for licensing. Lengthy storage may be required for solid wastes so appropriate records need to be kept and durable labels applied to waste packages.

Radiation detection and monitoring

A large diameter end-window or pancake type Geiger Muller tube monitor is the most suitable meter for contamination control. TLD personal dosemeters are barely capable of responding to ^{35}S beta radiation and are not mandatory (for details see the Personal Radiation Monitoring Safety Guideline).

Laboratory requirements

Low level lab guidance activities

Bench: 7.4 MBq
Fume cupboard: 74 MBq

Medium level lab guidance activities

Bench: 37 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.