

3H

Radioisotope Safety Data Sheet

Hydrogen 3 (tritium)

Half life 12.3 years

Radiations emitted

Beta rays 19 keV max, 6 keV average
yield 100%

Safety precautions

Tritium is a low energy beta emitter that only presents an internal hazard. Shielded workstations are not required because tritium beta rays have a very limited range in air (6 mm max) nor are they capable of penetrating to the growing layer of the skin.

Standard laboratory PPE (gloves, lab coat, safety glasses) should be used to avoid skin contamination and the possibility of uptake into the body.

Radiotoxicity data

Tritium is classed as being in the least hazardous group of isotopes according to AS 2243.4

The most restrictive Annual Limit on Intake by ingestion (ALI_{ing}) is 480 MBq and the most restrictive inhalation limit (ALI_{inhal}) is 490 MBq. These values are set for organic compounds of tritium that are generally more strongly retained than tritiated water.

Licensing requirements

Under the *Radiation Safety Regulation 2010*, a licence is required to possess tritium sources with concentrations equal to or greater than 1 MBq per gram and with activities of 10 MBq or greater.

In the University, possession licences are held by schools and centres rather than individuals. However, individual user licences are required for persons who use licenceable sources for research purposes.

Disposal data

The maximum allowable concentration of tritium in aqueous wastes released to a sewerage system is given in the 2010 *Regulation* as 76 MBq per m³ i.e. 76 kBq per litre.

The concentration of tritium in solid wastes disposed of to either the general or pathology

waste streams must be less than 500 kBq per gram (500 MBq per kg) – i.e. half the concentration limit for licensing. Wastes containing tritium should not be placed in a decay store as there will be no significant decay over reasonable time spans and accountability for the waste may be lost.

Where licensed users create wastes containing tritium they should consult with the practice RSO to determine the most appropriate method for the waste to be disposed of promptly.

Radiation detection and monitoring

Conventional GM and scintillation survey meters are incapable of detecting tritium contamination on surfaces by direct monitoring. 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 tritium use is continuous, at least at weekly intervals.

Since tritium is not an external hazard there is no requirement for personal monitoring for tritium users, nor are there any personal dosimeters capable of responding to energies this low.

Laboratory requirements

Low level lab guidance activities

Bench: 3.7 MBq
Fume cupboard: 37 MBq

Medium level lab guidance activities

Bench: 10 MBq
Fume cupboard: 100 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.