^{36}Cl

Radioisotope Safety Data Sheet
Chlorine 36

Half life 3 x 10^5 years

Radiations emitted

Beta radiation only: 709 keV max, 251 keV average, 98% yield.

Safety precautions

^{36}Cl is a medium energy beta emitter that presents both an internal and external hazard. Perspex shielding is required for workstations and waste bins. Handling tools, Perspex tube holders and standard laboratory PPE (gloves, lab coat, safety glasses) should be used to avoid skin exposure.

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

A fume cupboard should be used when handling volatile compounds or for processes that could produce aerosols.

Because of the potential for bremsstrahlung X-ray production, ^{36}Cl wastes should only be stored in Perspex bins and not in metal containers.

Radiotoxicity data

^{36}Cl is classed as being of low hazard (group 4) according to AS 2243.4. While this may seem at odds with the energy of the beta emission and the long half life, the very low specific activity (1 220 Bq/µg, vs 10^{10} Bq/µg for ^{32}P) means that relatively large masses would need to be taken into the body to produce appreciable doses.

The Annual Limit on Intake by ingestion (ALI_{ing}) is 22 MBq and the most restrictive inhalation limit (ALI_{inhal}) is 2.9 MBq.

Dose rates

Beta dose rate to the basal skin cells from contamination of 1 kBq cm^{-2} 1780 µSv h^{-1}

Beta dose rate from a 1 kBq (0.05 ml) droplet on skin: 773 µSv h^{-1}

Shielding

Total absorption of beta radiation is achieved with 2.4 mm perspex or 1.5 mm glass.

Maximum range in air: 2.6 m

Licensing requirements

Under the Radiation Safety Regulation 2010**,** a licence is required for the possession of ^{36}Cl sources with concentrations of greater than or equal to 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 ^{36}Cl in aqueous wastes released to a sewerage system is given in the 2010 Regulation as 1.47 MBq per m^3 i.e. 1.47 kBq per litre.

The concentration of ^{36}Cl 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 ^{36}Cl 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

A Geiger Muller tube monitor is the most suitable type of meter for contamination control. For personal monitoring, TLD dosemeters are recommended for both whole body and extremity monitoring. (For details see the *Personal radiation monitoring Safety Guideline*).

Laboratory requirements

Low level lab guidance activities

Bench: 370 kBq
Fume cupboard: 3.7 MBq

Medium level lab guidance activities

Bench: 1 MBq
Fume cupboard: 10 MBq

NB: 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.