

**<sup>51</sup>Cr**

# Radioisotope Safety Data Sheet

## Chromium 51

**Half life** 27.7 days

### Radiations emitted

Radiation	Energy, keV	Yield %
K $\alpha_1$ X-ray	4.95	13.1
K $\alpha_2$ X-ray	4.94	6.6
K $\beta$ X-ray	5.43	2.6
Gamma ray	320	9.9
Auger electron	4.4	67

### Safety precautions

<sup>51</sup>Cr is a medium energy gamma emitter that presents both an internal and external hazard.

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

Workstation shielding will not normally be required as the external radiation levels are very low and the duration of most work procedures is relatively short. However, wastes stored in the laboratory containing <sup>51</sup>Cr may require shielding. Wastes should be monitored with a survey meter to ensure radiation levels are acceptable.

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

### Radiotoxicity data

<sup>51</sup>Cr is classed as being of relatively low hazard (group 4) according to AS 2243.4.

The Annual Limit on Intake by ingestion (ALI<sub>ing</sub>) is 530 MBq and the most restrictive inhalation limit (ALI)<sub>inhal</sub> is 560 MBq.

### Dose rates

The gamma ray dose rate constant for <sup>51</sup>Cr is 4.7  $\mu$ Sv/h/ GBq @ 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm<sup>-2</sup> 14.9  $\mu$ Sv h<sup>-1</sup>

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 0.6  $\mu$ Sv h<sup>-1</sup>

### Shielding

Half value layer (HVL) for the 320 keV gamma ray = 2 mm lead

Tenth value layer (TVL) for the 320 keV gamma ray = 7 mm lead

### Licensing requirements

Under the *Radiation Safety Regulation 2010* a licence is required to possess <sup>51</sup>Cr sources with concentrations equal to or greater than 1 kBq 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 concentration of <sup>51</sup>Cr in aqueous wastes released to a sewerage system is given in the Radiation Safety Regulation 2010 as 36 MBq per m<sup>3</sup> i.e. 36 kBq per litre.

The concentration of <sup>51</sup>Cr 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.

### 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: 37 MBq

Fume cupboard: 370 MBq

Medium level lab maximum activities

Bench: 100 MBq

Fume cupboard: 1 GBq