

⁵¹Cr

Radioisotope Fact Sheet Chromium 51

Half life 27.7 days

Radiations emitted

Radiation	Energy (keV)	Yield (%)
X-ray	5	22
Gamma ray	320	9.8

Safety precautions

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

Handling tools and standard laboratory PPE (gloves, lab coat, 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 ⁵¹Cr 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 µSv per week, and in areas accessible to non-radiation workers, 10 µSv per week.

Radiotoxicity data

⁵¹Cr is classed as being of moderate hazard (Group 3) according to AS/NZS 2243.4.

The Annual Limit on Intake by ingestion (ALI_{ing}) is 530 MBq and the most restrictive inhalation limit (ALI_{inhal}) is 560 MBq.

Dose rates

The gamma ray dose rate constant for ⁵¹Cr is 6.3 µSv/h/ GBq at 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm⁻²: 14.9 µSv h⁻¹

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 0.6 µSv h⁻¹

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 2021*, a licence is required to possess ⁵¹Cr sources with concentrations equal to or greater than 1 kBq per gram and with activities of 10 MBq or greater. Individual use licences are required for persons who use licensable sources for research purposes.

Disposal data

The maximum concentration of ⁵¹Cr in aqueous wastes released to a sewerage system is given in the *Regulation* as 36 MBq per m³ i.e. 36 kBq per litre.

The concentration of ⁵¹Cr 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/OSL dosimeters are recommended for whole body personal monitoring.

Laboratory requirements

Indicative maximum activities:

Low level	Bench	37 MBq
	Fume cupboard	370 MBq
Medium level	Bench	100 MBq
	Fume cupboard	1 GBq

Low level lab maximum activities

Bench: 37 MBq
Fume cupboard: 370 MBq

Medium level lab maximum activities

Bench: 100 MBq
Fume cupboard: 1 GBq