

**<sup>45</sup>Ca**

# Radioisotope Fact Sheet

## Calcium 45

**Half life** 163 days

### Radiations emitted

Radiation	Energy (keV)	Yield (%)
Beta ray	257 - max, 77 - average	100

### Safety precautions

Calcium-45 is a medium energy beta emitter presenting a mainly internal hazard.

As Calcium is strongly retained by the bones, control measures should aim at preventing uptake by skin contact, ingestion or inhalation. Standard laboratory protective clothing (gloves, lab coat, safety glasses, closed shoes) should always be used.

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

A fume cupboard should be used for processes that could produce aerosols.

### Radiotoxicity data

<sup>45</sup>Ca is classed as being of high hazard (Group 2) according to AS/NZS 2243.4.

The Annual Limit on Intake by ingestion (ALI<sub>ing</sub>) is 26 MBq and the most restrictive inhalation limit (ALI<sub>inhal</sub>) is 7.4 MBq.

### Shielding

The perspex shields used for <sup>32</sup>P will also provide effective shielding for <sup>45</sup>Ca beta radiation.

While the potential for bremsstrahlung production is very low, the range of the beta radiation (60 cm max) warrants the use of Perspex workstations and waste containers.

### Dose rates

Beta dose rate to the basal skin cells from contamination of 1 kBq cm<sup>-2</sup>: 838 μSv h<sup>-1</sup>

Beta dose rate from a 1 kBq (0.05 ml) droplet on skin: 101 μSv h<sup>-1</sup>

### Licensing requirements

Under the *Radiation Safety Regulation 2021*, a licence is required for the possession of <sup>45</sup>Ca sources with concentrations of greater than or equal to 10 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 <sup>45</sup>Ca in aqueous wastes released to a sewerage system is given in the *Regulation* as 1.8 MBq per m<sup>3</sup> i.e. 1.8 kBq per litre.

The concentration of <sup>45</sup>Ca 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.

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 Geiger Muller tube monitor is the most suitable type of meter for contamination control. For personal monitoring, TLD/OSL dosimeters may be used for both whole body and extremity monitoring.

### Laboratory requirements

Indicative maximum activities:

Low level	Bench	3.7 MBq
	Fume cupboard	37 MBq
Medium level	Bench	7.4 MBq
	Fume cupboard	74 MBq