

**33P**

# Radioisotope Fact Sheet

## Phosphorus 33

**Half life** 25.6 days

### Radiations emitted

Radiation	Energy (keV)	Yield (%)
Beta ray	249 - max, 77 - average	100

### Safety precautions

<sup>33</sup>P is a low energy beta emitter presenting a mainly internal hazard. Since the range of <sup>33</sup>P beta rays in air is up to 60 cm, Perspex shielded workstations should be used. Handling tools and standard laboratory PPE (gloves, lab coat, safety glasses) should be used to avoid skin contamination.

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.

### Radiotoxicity data

<sup>33</sup>P is classed as being of high hazard (Group 2) according to AS/NZS 2243.4.

The Annual Limit on Intake by ingestion ( $ALI_{ing}$ ) is 83 MBq and the most restrictive inhalation limit ( $ALI_{inhal}$ ) is 14 MBq.

### Dose rates

Beta dose rate to the basal skin cells from contamination of 1 kBq cm<sup>-2</sup>: 865  $\mu$ Sv h<sup>-1</sup>

Beta dose rate from a 1 kBq (0.05 ml) droplet on skin: 138  $\mu$ Sv h<sup>-1</sup>

### Shielding

The perspex shields used for <sup>32</sup>P will also provide effective shielding for <sup>33</sup>P beta radiation.

While there is very low potential for bremsstrahlung production, the range of the beta radiation warrants the use of Perspex workstations and waste containers.

### Licensing requirements

Under the *Radiation Safety Regulation 2021* a licence is required to possess <sup>33</sup>P sources

with concentrations equal to or greater than 100 kBq per gram and with activities of 100 MBq or greater.

In the University, possession licences are held by University. However, individual use licences are required for persons who use licensable sources.

### Disposal data

The maximum allowable concentration of <sup>33</sup>P in aqueous wastes released to a sewerage system is given in the *Regulation* as 5.71 MBq per m<sup>3</sup> i.e. 5.71 kBq per litre.

The concentration of <sup>33</sup>P in solid wastes disposed of to either the general or pathology waste streams must be less than 50 kBq per gram (50 MBq per kg) – i.e. half the concentration limit for licensing.

### 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 are recommended for both whole body and extremity monitoring.

### Laboratory requirements

Indicative maximum activities:

Low level	Bench	4 MBq
	Fume cupboard	40 MBq
Medium level	Bench	10 MBq
	Fume cupboard	100 MBq