

# 33P

## Radioisotope Safety Data Sheet Phosphorus 33

**Half life** 25.6 days

### Radiations emitted

Beta rays 249 keV max, 77 keV average  
yield 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 low to moderate hazard (group 3b) according to AS 2243.4

The Annual Limit on Intake by ingestion (ALI<sub>ing</sub>) is 83 MBq and the most restrictive inhalation limit (ALI)<sub>inhal</sub> is 14 MBq.

### Dose rates

Beta dose rate to the basal skin cells from contamination of 1 kBq cm<sup>-2</sup> 865 μSv h<sup>-1</sup>

Beta dose rate from a 1 kBq (0.05 ml) droplet on skin: 138 μSv 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 2010* 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 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 allowable concentration of <sup>33</sup>P in aqueous wastes released to a sewerage system is given in the 2010 *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 dosimeters 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: 4 MBq  
Fume cupboard: 40 MBq

Medium level lab guidance activities

Bench: 10 MBq  
Fume cupboard: 100 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.