

PHOSPHORUS-33

[³³P]

Physical and Radiological Data

Physical half-life:	25.4 days
Beta emitter:	0.249 MeV (max), 0.083 MeV (average)
Maximum range in air:	18.1 inches = 46 cm

Concerns

- ◆ Monitoring
Because ³³P is a lower energy beta emitter, it is difficult to monitor with a radiation survey instrument. Wipe testing should be done frequently to monitor possible contamination.

Shielding

- ◆ Low-density materials can be used to shield ³³P. Plexiglas (lucite) is the most highly recommended, but acrylic, plastic, wood and water will also work.
- ◆ Shields should be thick enough to provide adequate protection from beta particles. Plexiglas of 3/8 to 1/2 inch is usually sufficient.

General Safety Precautions

- ◆ All persons handling ³³P must wear a whole body dosimeter and ring badge.
Ring badges should be worn on the hand which is most used for handling vials, pipettes, etc.
- ◆ All persons handling ³³P must wear a lab coat and disposable gloves.
Safety glasses are recommended.
- ◆ Do not work directly over an open vial or container of ³³P.
- ◆ Do not pipette ³³P by mouth.
- ◆ Pipettes should be committed solely to ³³P use and clearly labeled.
- ◆ Always have a radiation detection instrument in operation when handling ³³P.

Check the batteries before beginning. A single sheet of plastic wrap should be kept around the detection window to avoid contaminating it.

- ◆ Frequently monitor gloves, work area, floor, and shoes for contamination. Wipe test regularly.

Contamination

A radiation level greater than or equal to three times background is considered contamination. Here are some tips on what to do when contamination is found.

- ◆ If contamination is found on your hands:
Do not touch anything, this may spread contamination to door handles, etc. Wash thoroughly with non-abrasive soap and water, *blot* dry. Do not rub or abrade skin. Contact the RSO if this does not remove the contamination. Monitor areas that may have been touched.
- ◆ If contamination is found on your shoes/clothing:
Do not walk around in contaminated shoes. Contaminated clothing will need to be removed, but some shoes may be decontaminated with a commercial contamination remover. Survey the area and floor to determine the extent of contamination. Contact the RSO.
- ◆ If contamination is found on the floor:
Immediately mark off the area and prevent anyone from walking near the contamination. Use a commercial decontaminant (i.e. Radiacwash) with paper towels to clean the area. Swipe the paper towels only once across the area and discard (in radioactive waste). To use a sweeping motion would only spread the contamination. Be sure to monitor shoes. Contact the RSO.
- ◆ If contamination is found on the countertop, lab equipment, etc:
Use a commercial decontaminant and paper towels to clean the area. Place equipment in a shielded area if contamination cannot be removed.

Decay Table

DAYS	DECAY FRACTION	% ACTIVITY REMAINING
0	1.000	100
2	0.947	94.7
4	0.897	89.7
6	0.849	84.9
8	0.826	82.6
10	0.761	76.1
12	0.721	72.1
14	0.683	68.3
16	0.646	64.6
18	0.612	61.2
20	0.579	57.9
22	0.549	54.9
24	0.520	52.0
254 (10 HALF LIVES)	0.001	0.10