



Phosphorus-32

WORKING SAFELY WITH PHOSPHORUS-32

Radioactive half-life $T_{1/2}$	14.3 days
Principal emission	1.709 MeV beta (maximum)
Monitoring for contamination	Geiger-Müller detector
Biological Monitoring	Urine samples
Annual Limit on Intake (ALI) by inhalation	3×10^7 Bq (~1mCi) ** (Class D)
Maximum range in air	790 cm
Maximum range in water	0.8 cm
Dose rate from 1 MBq in 1 ml	210mSv/h (21rem/h) at surface 2.5µSv/h (0.25mrem/h) at 1 m
Shielding	1 cm Perspex (Plexiglas) cuts out betas and minimises production of Bremsstrahlung

	HOURS	0	12	24	36	48	60	72	84
DAYS	0	1.000	0.976	0.953	0.930	0.908	0.886	0.865	0.844
	4	0.824	0.804	0.785	0.766	0.748	0.730	0.712	0.695
	8	0.679	0.662	0.646	0.631	0.616	0.601	0.587	0.573
	12	0.559	0.546	0.533	0.520	0.507	0.495	0.483	0.472
	16	0.460	0.449	0.439	0.428	0.418	0.408	0.398	0.389
	20	0.379	0.370	0.361	0.353	0.344	0.336	0.328	0.320
	24	0.312	0.305	0.298	0.291	0.284	0.277	0.270	0.264
	28	0.257	0.251	0.245	0.239	0.234	0.228	0.223	0.217
	32	0.212	0.207	0.202	0.197	0.192	0.188	0.183	0.179
	36	0.175	0.170	0.166	0.162	0.159	0.155	0.151	0.147
	40	0.144	0.140	0.137	0.134	0.131	0.127	0.124	0.121
	44	0.119	0.116	0.113	0.110	0.108	0.105	0.102	0.100
	48	0.098	0.095	0.093	0.091	0.089	0.086	0.084	0.082
52	0.080	0.078	0.077	0.075	0.073	0.071	0.070	0.068	

Special Considerations

Phosphorus-32 is the highest energy radionuclide commonly encountered in research laboratories and as such requires special care. Avoid exposure e.g. do not hold tubes containing even small quantities of ^{32}P any longer than necessary - use a stand or holder. If quantities greater than a few tens of MBq (around a mCi) are used, wrist and finger dosimeters should be worn. Remember wrist badges alone may fail to indicate high dose to the finger tips. The use of lead-impregnated rubber gloves is also recommended. Even with low-density materials (for example, Perspex / Plexiglas) the absorption of the beta-particles gives rise to relatively high energy Bremsstrahlung which may require some lead shielding when quantities greater than a few hundred MBq (or tens of millicuries) are being handled.

** Based on occupational effective dose equivalent limit of 50 mSv for stochastic risks. In Germany the ALI value is 6×10^6 Bq.

The Annual Limit on Intake (ALI) data are based on the recommendations of the International Commission on Radiological Protection (ICRP) Publication 30 but may change should the ICRP Publication 60 recommendations be adopted by your national regulatory authority.

The data provided is general information which gives a basic understanding of radiation safety. You must however consult your local radiation protection adviser to ensure that you comply with all national regulations and local rules.