HARVARD
Campus Services
ENVIRONMENTAL HEALTH & SAFETY

Radioactive Materials Reference Sheet:

Phosphorous–32

Half-life : **14.28 days**
Type of Emitter : **Beta**
Beta Energy : **1.709 MeV**
Travel Distance in Air : **6.10 m : 240 inches : 20 feet**
Travel Distance in Tissue : **0.8 cm : 0.31 inches**
Travel Distance in Plexiglas/Lucite : **0.61 cm : 0.375 inch**

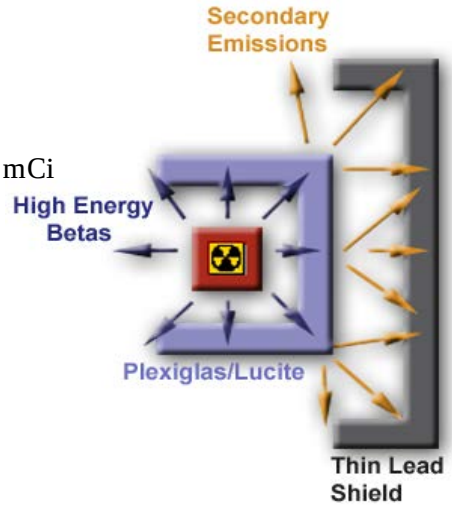
Annual Intake Limits
Inhalation : **0.4 mCi**
Ingestion : **0.6 mCi**

CONCERNS

High energy betas from ^{32}P pose an external (skin and lens of the eye) dose hazard, as well as a potential internal hazard. A high local skin dose can be received if contamination was allowed to remain on the skin or gloves. If 1 μCi of ^{32}P contaminated a 1 cm^2 area of bare skin, the skin exposure would be approx. 8 rem/hr.

SHIELDING

- ¼ - ½ inch thick plexiglas, acrylic, lucite, plastic, or wood. For mCi amounts, thin lead shielding (1/8 inch) may be added to the exterior of the plexiglas shield to absorb the higher intensity secondary radiation. Never reverse this order, as a higher dose can result. This also applies to waste.



DETECTION

- A survey meter and pancake probe should be used (efficiency of 17 - 28% on average). A low-energy NaI probe should be used only to detect secondary emissions such as Bremsstrahlung x-rays to ensure proper shielding.

- A Liquid Scintillation Counter may be used to detect removable ^{32}P contamination.
- You may scan for removable contamination by surveying a wipe of a given area with the survey meter and the GM probe.

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SPECIFIC EQUIPMENT / SUPPLIES

In addition to general equipment, the following are recommended for specific use of ^{32}P :

- Thick plexiglas, acrylic, lucite, plastic or plywood shielding.
- Thin lead or foil if secondary emissions are being generated.
- Finger ring (if in excess of 1 mCi, required).

SAFETY RULES FOR ^{32}P

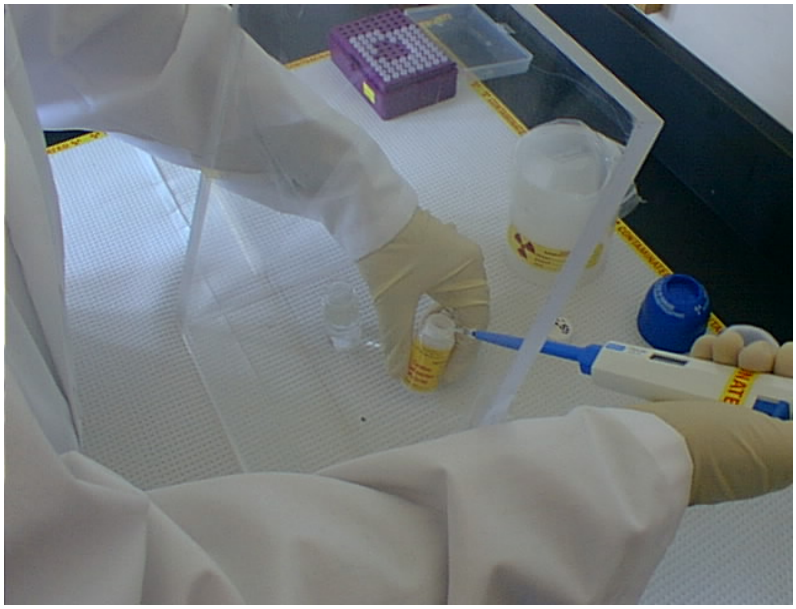
- Follow General Safety Precautions for all isotopes.

Specific Recommendations:

WHILE WORKING

- Avoid skin exposure by using tools to indirectly handle unshielded sources and potentially contaminated vessels. This increases the distance of separation and lowers exposure. Use plastic racks to minimize skin exposure.

- Place sample tubes in a plexiglas holder to minimize hand exposure when carrying.



- Suitable traps may be necessary to collect ^{32}P if large gas or vapor releases are anticipated.

- Do not work over open containers of ^{32}P without shielding. Shield all stock vials of ^{32}P (right). Do not use thin sheets of lead to shield ^{32}P. Use only to shield secondary emission, by placing them **outside** the plexiglas or plastic shield; **NEVER** the other way around.

- Safety glasses/goggles provide both splash and shielding protection for the eyes and should be worn while handling millicurie amounts.

POST-USE

- Dispose of ^{32}P waste according to the waste disposal guidelines. If by sink disposal, ensure that it is soluble in water and does not exceed the posted limit (10 μCi, if only one radionuclide is being disposed of). Do not exceed this limit, unless authorized by the Radiation Safety Committee in the permit.

- ^{32}P waste must be segregated and kept separate from other radioactive waste. This waste should be consolidated and stored in a location away from work and high traffic areas.

- Store your radioactive waste carefully. When more than a millicurie, place within a secondary lucite/plexiglas (shielded) container and increase your distance.