

## Radiation Safety Data Sheet (Phosphorous – 32)

### Physical Data

Half-life of  $^{32}\text{P}$  = 14.29 days.

Pure beta particle emission

Maximum beta particle energy = 1.71 MeV (100%)

Maximum beta particle range in air = 6.1 m (20 ft)

Maximum range of beta in water: 8 mm (0.3 in)

### Internal Occupational Limits

Annual limit on intake: 600  $\mu\text{Ci}$  (22 MBq) ingestion

**Licensing Requirement:** The Tufts University radioactive materials license details the possession, use, storage, receipt and transfer of radioactive materials. This license is on file in Tufts EHS and imposes certain limitations with respect to radionuclide, chemical compound, and quantity. It states that radioactive materials shall be used by, or under the supervision of individuals designated by the Radiation Safety Committee.

**Permit Requirement:** Each Principal Investigator requesting to use radioactive materials within their area under their jurisdiction is required to complete and forward form RSP-001 to the Radiation Safety Officer or Radiation Safety staff. Those permits approved by the RSO are subject to RSC review and approval.

**Storage & Oversight Requirement:** Stock vials containing radioactive materials are required to be secured at all times by either locking or providing full surveillance at all times. Please consult with the TU Radiation Safety staff to review the approved locking techniques.

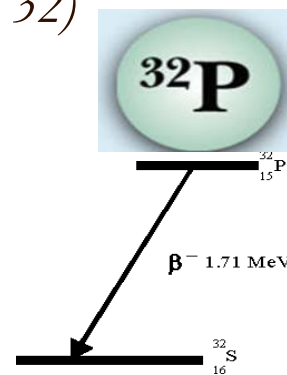
**Contamination Control:** Surface and personnel contamination is prevented by employing good handling techniques and continually monitoring the area. Places where unsealed sources are handled must assume to be contaminated unless appropriate measurements indicate that they are free from contamination.

- Transfers between open vessels by pipette, using spill trays and absorbent covering.
- Close and store all containers not in use.
- Never transfer an open container. Provide double containment when transferring radioactivity between processing areas.
- Avoid handling unnecessary large quantities of radioactivity and handle only one vessel at a time.
- Use lab coats, safety glasses, and disposable gloves.
- Avoid direct handling of potentially contaminated surfaces with a gloved hand (Protective clothing is for secondary protection only). Select gloves appropriate for chemicals handled.

Disclaimer: Tufts University Radiation Safety Data Sheets are intended for those that handle radioactive materials on Tufts University property. The precautions and recommendations provided are specific to Tufts University work environments and may not apply at your institution or licensed facility. Please consult with your internal Radiation Safety Office or regulatory agency for radiation safety guidance.

#### References:

1. Kocher, David C., Radioactive Decay Data Tables, Springfield: National Technical Information Service, 1981 DOE/TIC-11026.
2. Massachusetts Department of Public Health Radiation Control Program. 105 CMR 120.296 – Standards for Protection Against Radiation, 3/12/12



- Routinely monitor the work environment and promptly decontaminate gloves and work surfaces to maintain contamination and exposures As Low As Reasonably Achievable (ALARA).

**Radiological waste:** Contact Radiation Safety support staff for questions regarding waste management or collection (x66168).

**Training Requirements:** Individuals working in a radioactive materials permitted area are required to attend radiation safety awareness training. Individuals handling radioactive materials are required to attend Introduction to Radiation Safety training.

**Radiation Control & Shielding:** Penetrating radiation from radioactive materials include: Beta particles  $\geq \sim 100$  keV (both positrons and negatrons) and Bremsstrahlung. Shielding thickness of 3/8" of plexiglass is typically adequate to reduce the radiation intensity from  $^{32}\text{P}$  beta emission and provide ALARA conditions. Less likely conditions (i.e. those handling larger quantities of material (10's mCi)) require other materials, such as lead to effectively reduce intensity from secondary radiation (bremsstrahlung production). Consult with Radiation Safety staff (6-3450) to optimize your shielding design.

**Personnel Monitoring and Surveillance:** The high-energy beta emissions from  $^{32}\text{P}$  can present a substantial skin and eye dose hazard. The ALARA I level for skin contamination is .009  $\mu\text{Ci}/10\text{cm}^2$ . Weekly wipe test and daily direct measurements using a GM detector is required. Dosimetry is required for individuals that are likely to receive 10% of the regulatory occupational limit, or provided when working with quantities that exceed RSC established criteria (i.e. for  $^{32}\text{P}$  users, the whole body assignment threshold is 1 mCi).