

RADIONUCLIDE SAFETY DATA SHEET

NUCLIDE: F-18

FORMS: ALL SOLUBLE

PHYSICAL CHARACTERISTICS:

HALF-LIFE: 109.74 min.

TYPE DECAY: EC e⁺
gamma: 0.511 MeV (193 %)
beta: 0.633 MeV maximum

Hazard category: C- level (low hazard) : 1 mCi to 100 mCi
B - level (Moderate hazard) : > 100 mCi to 10 Ci
A - level (High hazard) : > 10 Ci

EXTERNAL RADIATION HAZARDS AND SHIELDING:

The gamma exposure rate at 1 cm from 5 mCi is 28.2 R/hr. The exposure rate varies directly with activity and inversely as the square of the distance. The 1/10 value layer in lead is 1.6 cm. The beta absorbed dose rate at 1 cm from 5 mCi is 1500 R/hr. The range of the 0.633 MeV beta is 0.1921 cm in Lucite and 0.0907 cm in glass.

HAZARDS IF INTERNALLY DEPOSITED:

The annual limit on oral intake (ALI) of F-18 corresponding to a whole-body guideline gamma exposure rate of 500 mrem/year is 5.4 mCi.

DOSIMETRY AND BIOASSAY REQUIREMENTS:

Film badges and dosimeter rings are required for all usage of F-18.

SPECIAL PROBLEMS AND PRECAUTIONS:

1. Because the specific gamma-ray constant for F-18 is high (5.65 R-cm/mCi-hr), syringe shields will be relatively ineffective at attenuating the 0.511 MeV annihilation quanta, so exposure reduction can best be achieved through avoiding unnecessary holding of the filled syringe prior to injection. Store stock material and filled syringes in lead pigs. Unnecessary exposure to personnel and other patients should be minimized by increasing distance from the patient while he is waiting to be scanned. The gamma exposure rate at 1 meter from a patient containing 5 mCi of F-18 will be approximately 2.5 mR/hr.
2. Segregate wastes with those with half-lives less than 4 days (e.g. Tc-99m).
3. Dilute aqueous wastes may be disposed to the sewer system in amounts of up to 1000 uCi daily per lab.