^{18}F

Radioisotope Fact Sheet

Fluorine 18

Half life 109.8 minutes

Radiations emitted

Radiation	Energy (keV)	Yield (%)
Positron	633 - max, 250 - average	97
Gamma ray	511	194

Safety precautions

^{18}F is a high energy positron emitter. Positrons are anti-electrons and their interaction with electrons found in normal matter results in mutual annihilation and conversion of their mass to energy emitted as 2 photons of 511 keV each.

^{18}F should only be manipulated behind lead bricks.

Use tools to indirectly handle unshielded sources and potentially contaminated vessels; avoid direct hand contact.

Standard laboratory PPE (gloves, lab coat, safety glasses) should also be used to minimise exposure.

Radiotoxicity data

^{18}F is classed as being of moderate hazard (Group 3) according to AS/NZS 2243.4.

The Annual Limit on Intake by ingestion limit (ALI_{ing}) is 410 MBq and the most restrictive inhalation (ALI_{inhal}) is 220 MBq.

Dose rates

The gamma ray dose rate constant is 188 µSv/h/ GBq at 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm^{-2}: 1950 µSv h^{-1}

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 788 µSv h^{-1}

Shielding

Store ^{18}F behind lead shielding.

Half value layer (HVL) for gamma rays: 6 mm lead

Tenth value layer (TVL) for gamma rays: 16 mm lead

Licensing requirements

Under the *Radiation Safety Regulation 2021*, a licence is required for the possession of ^{18}F sources with concentrations of greater than or equal to 10 Bq per gram and with activities of 1 MBq or greater. A use licence is also required for any persons who use such sources for research purposes.

Disposal data

^{18}F's short half-life (109.8 minutes) makes rigorous inventory tracking unnecessary. Also, storage for decay can normally be accomplished at the point of use, since ^{18}F compounds will decay to background levels within a day or two.

Radiation detection and monitoring

A Geiger Muller tube is suitable for contamination control. For personal monitoring, TLD/OSL dosemeters are recommended for both whole body and extremity monitoring.

Laboratory requirements

Indicative maximum activities:

Low level	Bench	500 kBq
	Fume cupboard	5 MBq
Medium level	Bench	2 MBq
	Fume cupboard	20 MBq