

What is Tritium ?

Tritium (^3H) is a radioactive isotope of hydrogen, whose specific activity is $358 \text{ TBq}\cdot\text{g}^{-1}$. Only tiny proportions of ^3H are in a natural state – there is approximately 1 tritium atom for every 10^{18} hydrogen atoms. Every year, approximately $70,000 \text{ TBq}$ (0.2 kg) of tritium is produced through interactions between cosmic radiation and various atmospheric components. The radioactive half-life of tritium is 12.3 years and the total natural tritium inventory is estimated to be $1,300 \text{ PBq}^1$ (3.5 kg).

Tritium exists in various different chemical forms: tritiated water (HTO), tritium gas (HT) and organically bound tritium (OBT).

Tritium is a low-energy beta emitter (mean energy 5.7 keV) and is generally considered to be an element with low radiotoxicity. It follows the hydrogen cycle and is diluted within it. The most commonly-found form in the biosphere is tritiated water, whose biological half-life following ingestion is estimated to be 10 days in an adult. The most common tritium exposure route is ingestion. An annual dose of approximately $0.01 \mu\text{Sv}$ is caused by exposure to naturally occurring ^3H .

¹ Main multiples of units used herein:
 10^3 kilo k; 10^6 mega M; 10^9 giga G; 10^{12} tera T; 10^{15} peta P; 10^{18} exa E