

White Phosphorus

White phosphorus, also known as yellow phosphorus, or P_4 , is a highly toxic and very reactive **chemical element** that is not found naturally in its elemental form. It has a waxy consistency, and is insoluble in water. White phosphorus catches fire when exposed to air, and is therefore stored under water.



A Fatal Dose of White Phosphorus on the nose of the Queen – on a 1p coin

White phosphorus is highly toxic by ingestion, and the lethal adult human dose is between 50 and 100mg. 100mg of sugar is between 10 and 20 grains. As compounds of phosphorus occur naturally in the body, and ingested white phosphorus is metabolised into other forms quite rapidly, it is difficult to measure white phosphorus exposure before or after death.

For this reason, White phosphorus became notorious as both a suicide solution and a murder method used by the likes of [Louisa Merrifield](#) and [Mary Wilson](#) who poisoned their unsuspecting husbands with rat poison which they added to meals. White phosphorus is no longer used for [matches](#) (it was banned by international treaty, the [Berne Convention, in 1906](#)), and no longer used as a rat poison (it was banned in the UK under [the 1963 Animals \(Cruel Poisons\) Regulations](#)).

It was (and still is) [used in military applications](#) including incendiary bombs, the manufacture of napalm and Molotov cocktails, tracer rounds, and for generating smoke screens. White phosphorus has been used recently in conflicts in the Middle East, and the phrase “war crimes” has resulted. Military uses of white phosphorus (especially against civilians) are constrained by international law.

Not surprisingly vials of white phosphorus are not allowed to be sent through the UK postal system or abroad, where a recent leaflet classifies the chemical as a “flammable solid”.

[DangerousGoods Leaflet July2013](#)

Phosphorus compounds, by contrast, are very important and very widely used chemicals, generally far less toxic (if at all), and are vital components of all life on Earth. Phosphorus compounds are most commonly used in fertilisers, but are also used for the production of pesticides, herbicides, detergents, plasticisers, steel,

flame-retardants, and of course, matches. But conversely they have been used to create some nerve gases.

The presence of phosphorus compounds in living creatures (approximately 1% by mass) makes it very difficult to identify the presence of toxic white phosphorus, without a specific gas chromatographical test.

It is certainly [a very deceptive element](#).

Some technical information relating to the chemical and its breakdown products and environmental fate can be read below.

[WP Chem.pptx](#)

Studies of its [long lasting persistence in the environment](#) show that it is very slow to reduce to harmless chemicals in sediment waterbodies with low oxygen such as at Rattlechain lagoon, and that characterisation of the spread of P₄ in such sediments cannot be derived from just averaging readings from a few limited tests. This means that [remediation techniques](#) for such contaminated sites are virtually impossible to predict, and as has happened at sites in the US, phosphine gas has been associated with unforeseen consequential releases.

