

# Engineering Materials



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## Tungsten to replace lead

EU Directive 2011/65/EU (RoHS 2) regulates the use of certain hazardous substances in electrical and electronic equipment, with lead ranked at the top of the list, higher than mercury and cadmium. It means lead is highly toxic and does not break down easily, which is why a weight proportion of only 0.1% is permitted in new electronic and electric equipment. It also has a melting point of 327°C, constituting an additional hazard in case of fire.



However, Wolfram Industrie is offering a more environmentally friendly alternative. Triamet, a heavy metal alloy based on tungsten, features high density and high radiation absorption capacity.

The dimensionally stable product is available in both an iron-nickel and a copper-nickel binder phase, and it will shield against gamma radiation. While tungsten is normally difficult to process, it can be shaped into blanks using a powder-metallurgical process. These blanks can be processed further with little effort.

Since tungsten is a dense, heavy material, it is particularly well suited for restricting beam inlets in collimators or shielding against high-energy electromagnetic radiation. Dangerous gamma radiation and x-rays in particular can be contained given the high absorption value of the metal powder mixture.

In addition, due to Triamet's high melting point of more than 1,000°C, there is no risk of melting in case of a fire. However, only powder-metallurgical processing is possible. For the production of Triamet, tungsten powder is mixed with iron and nickel or copper and nickel powders. Subsequent shaping is either realised hydraulically with binding agents and a press, or isostatically under pressures of 2,000 to 3,000 bar. The former is suitable for smaller dimensions, the latter for large-scale components. The resulting green parts are sintered into semi-finished products in an electrically heated vacuum oven or in a reduced hydrogen atmosphere.

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<http://www.materialsforengineering.co.uk/engineering-materials-news/tungsten-to-replace-lead/163429/>