

Titanium – first choice in aircraft construction Extensive Production Process

Titanium – *the* material for aircraft industry: extremely light, exceptionally high resistant, durable. Wherever high stability and less weight are requested this material is the first choice. That is why HIRSCHMANN uses titanium for the inner rings of their newest generation of spherical bearings. It transmits forces and movement and therefore must be flexible and high resistant at the same time. The high-quality material is in the same class as ceramic but in direct comparison it is more interesting for the customer because of the favorable price. Due to its characteristics titanium is a constant in aerospace technology. But titanium makes high demand on operating and cold forming is difficult. This is the reason why HIRSCHMANN relies on a material combination and uses aluminum for the outer part of their lightweight spherical bearings.

Titanium – a successful story

In earth crust titanium is one of the ten most abundant elements but nearly exclusively occurs chemically bound as element of minerals. In 1791 in England the amateur chemist William Gregor discovered titanium in Ilmenite. Four years later the German chemist Heinrich Klaproth found it in Rutile and named the element for the Titans of Greek Mythology. Only in 1831 Justus von Liebig was successful in extracting metallic titanium from the ore. Pure metallic titanium (99,9%) was first prepared in 1910 by Matthew A. Hunter by heating $TiCl_4$ with sodium at 700-800°C in a steel bomb. At the end of the 1930s William Justin Kroll developed a new process for titanium extraction and opens it for commercial production. Main mining regions are Australia, Scandinavia, North America, the Ural and Malaysia - in 2010 new sources occurred in Paraguay.

Pure titanium can hardly be found in soil and must be extracted from titanite iron ore (Ilmenite) or Rutile. The extensive production process is reflected in the price for titanium which is 35 times higher than the price for steel alloys and 200 times higher than the price for crude steel (as at 2013). The largest producers are Australia, South Africa, Canada, China and Norway.



Titanium inner ring with coating.

Photo: HIRSCHMANN GmbH

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About HIRSCHMANN

For more than 60 years HIRSCHMANN develops and manufactures trendsetting products amongst others for vehicle construction, motor sport, aerospace, railed vehicles, mechanical engineering, naval architecture and wind power plants. Core competences lie in the three product lines Rod Ends and Spherical Bearings, Rotary Indexing Tables and Reference Systems. In these sectors HIRSCHMANN has extensive expert knowledge as well as experience for decades and can offer beside a varied standard assortment also customer-specific solutions. The medium-sized enterprise from Baden-Württemberg with sales companies in US and China actually has about 200 employees.