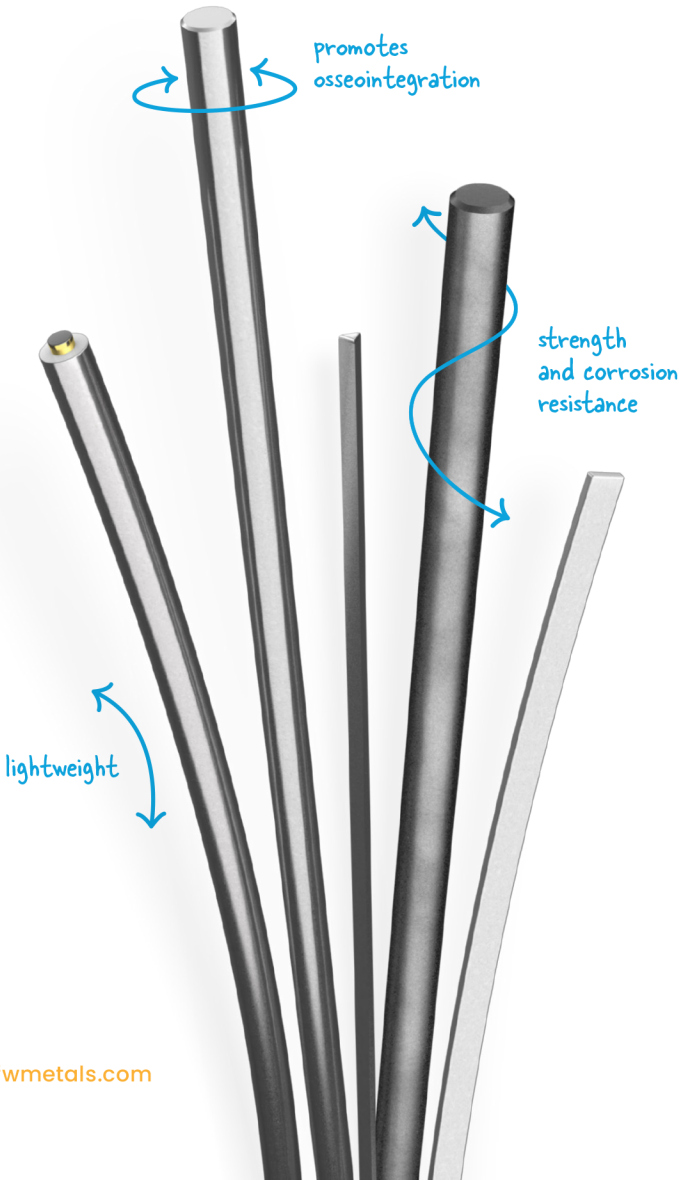
Titanium

Commercially pure and alloyed materials
with dependable properties



Exploring **titanium**

Stronger, lighter, and more corrosion resistant than standard stainless steel, titanium is a powerful component in applications requiring materials that go the extra mile. In addition to its strength-related properties, titanium offers a distinct advantage over other alloys – impressive biocompatibility. Titanium promotes osseointegration, meaning that bone can grow into the material, further helping to anchor implants in the body.

Typical end uses

Our customers use titanium in applications requiring good biocompatibility and performance under pressure, such as:

- Pacing leads
- Needles
- Sutures
- Orthopaedics
- Dental implants

Understanding titanium

Titanium comes either as a commercially pure material or alloyed with a secondary element to customize its properties.

COMMERCIALLY PURE TITANIUM is divided into four distinct grades, numbered 1 through 4. The grade is related to the required corrosion resistance, ductility, and strength. Properties range from grade 1, with the highest corrosion resistance and formability but the lowest strength, through grade 4, which offers the highest strength with moderate ductility.

ALLOYED TITANIUM combines the already superior performance of titanium with the beneficial properties of additional elements, including aluminum, vanadium, and niobium. Careful control during the melt process for some chemistries can improve cleanliness and material performance. Beta titanium alloys can provide excellent formability, alongside superior strength and corrosion resistance.

Finding the right alloyed titanium

With common applications in markets from orthodontics to aerospace, titanium often relies on the characteristics of other elements to complement its performance. By choosing different alloying elements, or by adding additional materials to the melt, you can customize the performance of your alloyed titanium to offer greater ductility, like with ELI material, or to reduce risk factors associated with other elements, for example by swapping vanadium for niobium.

- **Ti 6Al-4V ELI:** interstitial elements such as carbon and oxygen are tightly controlled during the melt process in order to improve the ductility and fracture
- **Ti 6Al-4V:** similar performance to Ti 6Al-4V ELI, but is typically more cost-effective
- **Ti-3Al-2.5V:** softer than Ti 6 Al-4V, popular for applications that don't require long-term performance
- **Ti-6Al-7Nb:** niobium is used in place of vanadium while providing similar performance
- **Ti Beta 3:** increased strength to elasticity ratio when compared to stainless steel, popular for orthodontic applications
- **Ti Beta C:** very formable, increased hardenability and creep resistance over other titanium alloys

Product forms and capabilities

Titanium can be processed into a variety of wire, bar, or complex constructions, and used in secondary operations.

ROUND wire with a circular cross section

FLAT wire with a rectangular cross section

SHAPED wire with specialty shaped cross sections

COIL loosely wound coil in large diameters

BAR polished bar made to tight tolerances

DFT® COMPOSITE WIRE two dissimilar materials in a single wire construction

MECHANICAL ASSEMBLY custom crimps, fittings, and specialized parts

COATING electrical insulation or chemical separation with custom coatings

4TiTUDE® bar

Combine the beneficial properties of commercially pure titanium with those of alloyed titanium like Ti 6Al-4V ELI. With 4TiTUDE® bar, you can rely on both strength and excellent biocompatibility without sacrificing either property.

Scan to visit our website for additional information on this topic and more.

LOCATIONS AROUND THE WORLD

Global Headquarters
Fort Wayne, Indiana, U.S.A.

European Headquarters
Castlebar, Co. Mayo, Ireland

Advanced Materials Development
Columbia City, Indiana, U.S.A.

International Sales Support
Shanghai, China
Augsburg, Germany
Potheri Chennai, India
Savyon, Israel
Kobe, Japan
Seoul, Korea

U.S.A. Sales Support
San Mateo, California
Ridgefield, Connecticut
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