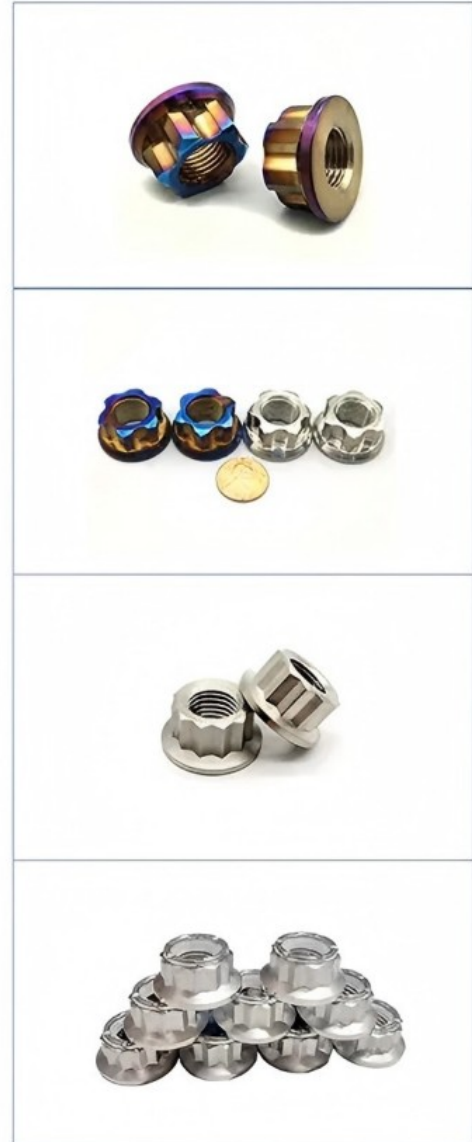


Titanium Alloy Screws: The “Rice of Industry” in High-End Manufacturing Set for Explosive Growth



SUPPORT CUSTOMIZATIONS IN VARIOUS COLORS.

Xian, Shanxi Jun 8, 2026 ([Issuewire.com](https://www.Issuewire.com)) - Key Takeaway: Thanks to their four core advantages—lightweight, high strength, corrosion resistance, and biocompatibility—titanium alloy screws are rapidly expanding beyond niche markets such as aerospace and healthcare into mainstream sectors including new energy vehicles, consumer electronics, and marine engineering. By 2026, China's [titanium screw](#) market is projected to reach 2.26 billion yuan, representing a year-over-year

growth of 21.5%—a growth rate far exceeding that of the general fastener industry.

I. Outperforming Traditional Materials, Becoming an “Essential Requirement” for High-End Manufacturing

Titanium alloy screws (primarily TC4/Ti-6Al-4V) have a density of only 60% that of steel and a tensile strength exceeding 900 MPa—equivalent to high-strength steel. They are also rust-proof, non-magnetic, and resistant to both high and low temperatures, perfectly addressing the shortcomings of traditional steel and aluminum screws.

Extreme Weight Reduction: Using titanium screws in new energy vehicle battery packs can reduce vehicle weight by 9 kg per unit, increasing range by 2.2%. In the aerospace sector, every 1 kg of weight reduction can save tens of thousands of yuan in fuel costs.

Superior Corrosion Resistance: In extreme environments such as seawater, acids, alkalis, and hydrogen sulfide, they have a service life of up to 30 years—far exceeding that of stainless steel.

Biocompatibility: Non-toxic, non-magnetic, and compatible with human tissue, making it the material of choice for orthopedic implants and dental implants.

Extreme Operating Conditions: Capable of stable operation from -196°C to 600°C , suitable for demanding applications such as satellites and nuclear reactors.

II. Breakthrough in Military and Aerospace Validation: Performance Exceeds That of High-Strength Steel

On June 1, 2026, joint testing by the U.S. Army and a third-party laboratory revealed that IperionX titanium alloy screws achieve a yield torque of 563–615 ft-lbf, representing an increase of nearly 20% compared to SAE Grade 8 high-strength steel (480–502 ft-lbf). While retaining titanium’s advantages of lightweight and corrosion resistance, these screws deliver mechanical properties on par with high-strength steel.

These test results provide authoritative validation for the large-scale replacement of steel screws with titanium screws in military vehicles, armored equipment, and aircraft engines, marking the official entry of titanium alloy screws into the phase of large-scale application under the **“titanium-for-steel”** initiative.

III. Breakthroughs in Domestic Technology: Reducing Reliance on Imported High-End Wire Materials

Leading domestic enterprises continue to overcome technical bottlenecks. Baotai Group has successfully developed TC4 and TC16 titanium alloy coiled wire with a single-coil weight exceeding 100 kg, achieving breakthroughs in key technologies such as heavy-coil rolling, high-precision tolerance control, and surface lubrication coatings. This fills a domestic gap and lays the foundation for the localization of aerospace fasteners.

Meanwhile, micro cold heading technology has achieved a 92.6% pass rate for titanium screws smaller than 1.5 mm in diameter, meeting the demands of precision sectors such as consumer electronics and medical devices.

IV. Explosive Growth in Applications: From “Hidden Components” to “Core Value”¹. Aerospace

(Largest Demand, Accounting for 52%)

A single C919 domestic airliner requires over 100,000 [titanium alloy fasteners](#); Satellite titanium screws maintain a thermal expansion coefficient of just 0.003 mm/°C across a temperature range of ^{**}-150°C to 180°C^{**}, ensuring structural precision.

2. Medical (High Value-Added)

Titanium screws for orthopedic implants have a fatigue strength of up to 1,200 MPa and have passed GB/T 16886 biocompatibility certification; Surface micro- and nano-texturing and drug-eluting coating technologies elevate these screws from mere “fasteners” to “smart implants.”

3. New Energy Vehicles (Fastest-Growing Segment)

With surging demand for lightweight battery packs, electric motors, and chassis, β-type titanium alloy screws will achieve a strength of 1,350 MPa while reducing costs by 25%. Large-scale application is expected by 2026.

4. Consumer Electronics (Precision Benchmark)

Apple and Huawei’s flagship models extensively use titanium screws with diameters as small as 1–2 mm for securing cameras, hinges, and motherboards. These screws reduce weight and prevent signal shielding, commanding a premium of 2.8 times that of traditional steel screws.

5. Marine / Chemical

Titanium screws used in deep-sea equipment, desalination plants, and oil platforms offer 30 years of maintenance-free operation, significantly reducing operational and maintenance costs.

V. Market Landscape: Concentration at the High End, Accelerated Domestic Substitution

By 2025, the domestic high-end titanium screw market is projected to reach 8.64 billion yuan, with leading companies such as Baotai Titanium, Western Superconductor, and Xiangtuo Jintian Titanium Industry holding a ^{**}78.3%^{**} market share.

As domestic technology matures and costs decline, titanium screws are transitioning from a “luxury item” to a “necessity.” The domestic market is projected to exceed 15 billion yuan by 2030, with a compound annual growth rate of 12.3%.

VI. Future Trends: Material Innovation + Smart Manufacturing + Functional Upgrades

1. Material Upgrades: Low-modulus, vanadium- and aluminum-free titanium alloys (Ti-Nb-Zr series) are better suited for the human body; high-temperature titanium alloys support the next generation of aircraft engines.

2. Manufacturing Innovations: 3D printing enables the one-piece molding of screws with complex structures and gradient properties; digital twins are integrated throughout the entire process to enhance batch consistency.

3. Functionalization: Antimicrobial, drug-eluting, and self-healing coatings endow screws with active

therapeutic and corrosion-resistant capabilities.

Titanium alloy screws have become a key indicator of a nation's advanced manufacturing capabilities. From "national strategic assets" in the defense and aerospace sectors, to "hidden champions" in new energy and consumer electronics, and finally to "lifelines" in healthcare, this tiny screw is driving a trillion-dollar high-end manufacturing market and has become a crucial fulcrum for the upgrading of China's manufacturing industry.

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