

# Commercial Supply Proposal

## Titanium Sheet and Plate

**Global Supply Regions:** North America (USA, Canada, Mexico), European Union & UK (Germany, France, Italy, Netherlands, Poland, Spain), Asia-Pacific (Japan, South Korea, Singapore, Australia, India), Middle East (UAE, Saudi Arabia, Qatar, Turkey), Latin America (Brazil, Argentina, Chile)

**Target Industries:** Aerospace & Defense, Chemical Processing, Marine & Offshore, Medical Devices, Power Generation (Nuclear & Thermal), Architecture & Corrosion-Resistant Construction, Food & Beverage, Motorsport

### 1. Product Description and Technical Parameters

Titanium sheet and plate represent flat-rolled semi-finished products manufactured through hot and cold rolling with subsequent thermomechanical processing. Titanium alloy sheets and plates deliver an exceptional combination of specific strength, corrosion resistance in aggressive environments (seawater, salt solutions, nitric and acetic acids, chloride media), and biological inertness.

Our procurement framework ensures full mill-direct traceability, lot-level chemical certification, and compliance with ASTM, AMS, ISO, and GOST specifications for clients operating across multiple regulatory jurisdictions.

#### 1.1. Alloy Grades and Applications

Alloy Grade	International Equivalent	Classification	Key Alloying Elements	Critical Properties	Typical Applications
VT1-0	Grade 2 (UNS R50400)	Commercially Pure Titanium	Ti >= 99.2%	Maximum corrosion resistance, high ductility, biocompatibility	Chemical vessels, heat exchangers, medical implants, food processing equipment
VT1-00	Grade 1 (UNS R50250)	High-Purity Titanium	Ti >= 99.5%	Enhanced corrosion resistance in reducing environments	Electrochemical industry, anode assemblies
VT6 (Ti-6Al-4V)	Grade 5 (UNS R56400)	Alpha+Beta Structural Alloy	Al 5.3-6.8%, V 3.5-4.5%	Optimal strength-to-weight ratio (UTS >= 900 MPa), fatigue resistance	Aerospace skin panels, structural airframe components, marine hardware

<b>Alloy Grade</b>	<b>International Equivalent</b>	<b>Classification</b>	<b>Key Alloying Elements</b>	<b>Critical Properties</b>	<b>Typical Applications</b>
VT5-1	Grade 6 (UNS R54520)	Alpha Structural Alloy	Al 4.0-5.5%, Sn 1.0-2.0%	Elevated temperature capability to 400-450°C, good weldability	Compressor blades, turbine casings, heat-resistant structures
OT4	Near-Grade 9	Medium Alpha Alloy	Al 2.0-3.5%, Mn 0.8-2.0%	Excellent formability and weldability	Aerospace welded structures, shipbuilding, pressure vessels
OT4-0	Ti-3Al-2Mn type	Low-Alloy Alpha	Al 1.0-2.5%, Mn 0.5-1.5%	High ductility at ambient and elevated temperatures	Deep drawing applications, skin panel welding
OT4-1	Ti-3.5Al-2Mn type	Medium Alpha Alloy	Al 2.5-3.5%, Mn 1.0-2.0%	Enhanced strength with retained weldability	Structural bulkheads, fuel tanks, process piping
PT-3V	Near-Grade 19	Marine Alpha Alloy	Al 2.5-3.5%, V 2.0-3.5%, Mo 0.8-2.5%	High strength under impact/dynamic loading, salt corrosion resistance	Deep-subsea equipment, marine structures, propeller shafts
VT20	Ti-6Al-2V-2Mo-2Zr	Heat-Resistant Alpha+Beta	Al 5.5-7.0%, V 0.8-2.0%, Mo 1.5-3.0%, Zr 1.5-2.5%	Service capability to 500°C, creep resistance	Aero-engine components, combustion chambers
VT14	Ti-5Al-3Mo-3V	Structural Alpha+Beta	Al 5.0-6.5%, Mo 2.5-3.5%, V 2.5-3.5%	High hot-strength, good forgeability	Structural components to 400°C operating temperature

## 1.2. Standards and Compliance Framework

Product Category	Primary Standard	Alternate / Russian Standard	Key Parameters
Cold-rolled titanium sheets	ASTM B265, AMS 4902	GOST 22178-76	Thickness 0.3-10.0 mm, width 600-1500 mm, length 1000-4000 mm
Hot-rolled titanium plates	ASTM B265, AMS 4911	GOST 23755-79	Thickness 10-160 mm, width 600-2000 mm, length 1000-6000 mm
Aerospace-grade sheets/plates	AMS 4907, AMS 4928, AMS 4954	TU 1825-566-07510017-2005	Expanded dimensional range for nuclear and aerospace applications
Chemical composition	ASTM B265, ISO 5832-2	GOST 19807-91	Normalized Ti, Al, V, Mo, Mn, Fe, O, N, H, C content
NDT and quality control	ASTM E2375, ASTM E1444	GOST 14782-86, GOST 18442-80	Ultrasonic testing, dye penetrant inspection, spectrographic analysis

### 1.3. Mechanical Properties at Room Temperature

Alloy Grade	UTS ( $\sigma_B$ ), MPa	Yield Strength ( $\sigma_{0.2}$ ), MPa	Elongation ( $\delta$ ), %	Reduction of Area (psi), %	Hardness HB
VT1-0 / Grade 2	$\geq 343$	$\geq 294$	$\geq 25$	$\geq 40$	$\leq 140$
VT1-00 / Grade 1	$\geq 294$	$\geq 196$	$\geq 30$	$\geq 45$	$\leq 120$
VT6 / Grade 5	$\geq 900$	$\geq 830$	$\geq 8$	$\geq 20$	310-350
VT5-1 / Grade 6	$\geq 686$	$\geq 588$	$\geq 10$	$\geq 25$	250-300
OT4 / Grade 9 type	$\geq 588$	$\geq 441$	$\geq 15$	$\geq 30$	200-250
OT4-0	$\geq 441$	$\geq 343$	$\geq 20$	$\geq 35$	160-200
OT4-1	$\geq 539$	$\geq 441$	$\geq 15$	$\geq 30$	180-230
PT-3V	$\geq 686$	$\geq 588$	$\geq 12$	$\geq 25$	220-270
VT20	$\geq 931$	$\geq 833$	$\geq 6$	$\geq 15$	300-340
VT14	$\geq 883$	$\geq 785$	$\geq 8$	$\geq 20$	280-320

## 2. Supply Chain Risk Analysis: Direct China Procurement Pain Points

Based on Metal-Asia.pw's extensive quality audit experience across global industrial clusters, the following systemic risks are routinely identified when procurement teams source titanium sheet and plate directly from unverified Chinese mills:

<b>Risk Category</b>	<b>Manifestation for the Buyer</b>	<b>Consequence</b>
<b>Chemistry Non-Conformance</b>	Mill certifies Grade 5 (Ti-6Al-4V), but actual O and N content exceeds ASTM B265 / GOST 19807-91 limits, resulting in weld embrittlement	Batch rejection at incoming inspection, production schedule disruption, sunk logistics costs
<b>Incomplete Documentation Package</b>	Vendor provides internal quality cert without heat numbers, missing UT and penetrant inspection reports, no material traceability matrix	Customs clearance delays, inability to meet AS9102 First Article requirements, audit failures for ISO/AS9100 compliance
<b>Logistic Opacity and Lead-Time Drift</b>	Shipment routed through multiple freight forwarders with transshipment at undisclosed ports, no real-time container tracking	Unpredictable delivery windows (45-120 days), packaging degradation, surface corrosion from saltwater exposure
<b>Incorrect HS Code Classification</b>	Product misdeclared under HS 8108.90.50 general category instead of aerospace-specific subheadings, triggering customs scrutiny	Duty reassessments, cargo seizures, administrative penalties, delayed project timelines
<b>Absence of Local Customs Representation</b>	Buyer independently clears cargo at port of entry, facing unexpected laboratory hold for RoHS/REACH verification	10-15 day customs extension, demurrage and detention charges, expediting fees
<b>Sanctions and Payment Interdiction Risk</b>	Transactions in CNY routed through intermediary banks subject to secondary sanctions or compliance screening	Payment freezing, goods stranded at origin, inability to recover prepayments, supplier relationship damage
<b>Surface and Packaging Deficiency</b>	Sheets shipped without corrosion inhibitor coating, inadequate timber crating, mechanical damage from insufficient dunnage	Excessive surface preparation costs, re-passivation requirements, visual standard rejection
<b>No Procurement Compliance Support</b>	Chinese vendor unfamiliar with ITAR/EAR, DFARS flow-down, or EU defense procurement directive requirements	Inability to serve defense/aerospace contracts, absence of in-country warranty and technical support

## 3. The Metal-Asia.pw Integrated Procurement Solution

Metal-Asia.pw operates as a **Global Titanium Procurement Integrator**, delivering end-to-end supply chain compliance from heat selection through to dockside or warehouse delivery. We neutralize the risks identified above through the following embedded procedures:

### 3.1. Pre-Shipment Quality Assurance (PSI) and Mill Audit

- **Chemical Verification:** OES (Optical Emission Spectrometry) and XRF (X-Ray Fluorescence) analysis of every heat lot against ASTM B265 / GOST 19807-91 specification limits. Full mill-test report (MTR) cross-check.
- **Non-Destructive Testing (NDT):** Ultrasonic Testing (UT) per ASTM E2375 / GOST 14782-86 for internal soundness; Liquid Penetrant Inspection (LPI) per ASTM E165 / GOST 18442-80 for surface integrity.
- **Mechanical Testing:** Tensile testing for UTS and yield strength; Brinell hardness measurement.
- **Dimensional and Visual Inspection:** CMM-based dimensional verification with photographic documentation for every sheet and plate.
- **Compliance Audit:** Mill-level assessment for ISO 9001, AS9100, and NADCAP accreditation status.

### 3.2. Supply Chain Compliance and Documentation Management

- **Full Certification Package:** Mill Test Report (MTR), Certificate of Conformance (CoC), NDT inspection protocols, Material Traceability Statement, Declaration of Conformity (DoC) to REACH / RoHS where applicable.
- **Customs Clearance Turnkey:** Correct HS Code determination, duty drawback optimization, Import/Export license coordination (including ITAR/EAR compliance for defense applications).
- **Defense and Aerospace Procurement Support:** RFQ and RFP response support, DFARS flow-down compliance, technical specification preparation, long-term agreement (LTA) structuring.
- **Quality Agreement Framework:** PPAP / First Article Inspection Report (FAIR) preparation per AS9102 for new product introduction.

### 3.3. Global Logistics and Inventory Solutions

- Multimodal freight forwarding (ocean + rail + road) with real-time tracking via EDI/API integration.
- Cargo insurance under Incoterms 2020 CIP / DAP with comprehensive damage coverage.
- Payment terms: Letter of Credit (L/C), Documentary Collection (D/P), or open account for qualified partners.
- Delivery to industrial hubs: Houston, Chicago, Los Angeles, Montreal, Hamburg, Rotterdam, Antwerp, Milan, Warsaw, Istanbul, Dubai, Jeddah, Mumbai, Singapore, Seoul, Tokyo, Sydney, Sao Paulo, plus all CIS regional centers.

---

## 4. Full Product Range: Titanium Sheet and Plate

Product Description	Alloy Grades	Dimensions (Thickness x Width x Length), mm	Standard	Primary Application
Cold-rolled titanium sheet	VT1-0 / Grade 2, VT1-00 /	0.3-3.0 x 600-1200 x 1000-3000	ASTM B265, AMS 4902, GOST	Heat exchangers, chemical process

<b>Product Description</b>	<b>Alloy Grades</b>	<b>Dimensions (Thickness x Width x Length), mm</b>	<b>Standard</b>	<b>Primary Application</b>
	Grade 1		22178-76	vessels
Hot-rolled titanium sheet	VT1-0 / Grade 2, VT6 / Grade 5, OT4, PT-3V	3.0-10.0 x 800-1500 x 1500-4000	ASTM B265, AMS 4911, GOST 22178-76	Marine cladding, aerospace panels
Titanium plate (medium gauge)	VT6 / Grade 5, VT5-1 / Grade 6, VT20, VT14	10-80 x 600-2000 x 1000-4000	ASTM B265, GOST 23755-79	Machining blanks, flanges, structural forgings
Heavy titanium plate	VT6 / Grade 5, VT20, VT22	80-160 x 600-1500 x 1000-3000	ASTM B265, GOST 23755-79	Press tooling, heavy forging stock
Diamond / checkered plate	VT1-0 / Grade 2	2.0-5.0 x 1000-1500 x 2000-4000	Custom Spec	Architectural decking, anti-slip platforms
Perforated titanium sheet	VT1-0 / Grade 2, OT4	1.0-4.0 x 600-1200 x 1000-2500	Custom Spec	Filter elements, gas-liquid separators
Titanium clad / welded plate	VT1-0 / Grade 2, OT4-0	2.0-8.0 x 1000-2000 x 2000-6000	Custom Spec	Pressure vessel shells, tank fabrication
Medical-grade sheet	VT1-00 / Grade 1, VT1-0 / Grade 2	1.0-5.0 x 600-1000 x 1000-2000	ISO 5832-2, ASTM F67, GOST R ISO 5832-2	Surgical instruments, orthopedic implants
Anodized titanium sheet	VT1-0 / Grade 2	0.5-2.0 x 600-1200 x 1000-2500	Custom Spec	Anode protection structures, electrolysis
Food-industry sheet	VT1-0 / Grade 2	1.0-4.0 x 1000-1500 x 2000-4000	FDA / EU 10/2011 compliant, GOST	Juice reservoirs, winemaking equipment

## 5. Customs Classification and Harmonized System (HS) Codes

<b>Product Category</b>	<b>HS Code</b>	<b>Duty Rate (General)</b>	<b>VAT / GST</b>	<b>Compliance Notes</b>
Titanium sheets and plates, general purpose	8108.90.50	Varies by destination country	Per local regulation	Certificate of Conformance to ASTM / ISO

Product Category	HS Code	Duty Rate (General)	VAT / GST	Compliance Notes
Aerospace-grade sheets for aero-engines	8108.90.50.10	0% (with export license)	Exempt with end-use certificate	ITAR/EAR license, end-user statement
Sheets for civil aircraft structures	8108.90.50.10	0%	Exempt	FAA/EASA airworthiness compliance documentation
Nuclear-grade titanium plates	8108.90.50	Standard rate	Per local regulation	RCC-M / ASME Section III compliance, nuclear quality assurance
Sponge titanium (raw material)	8108.20.00	Standard rate	Per local regulation	Country of origin certificate, radiological clearance

**Note:** Duty and VAT rates vary by destination jurisdiction. Metal-Asia.pw provides landed-cost modeling inclusive of customs duties, VAT/GST, and clearance fees for all major markets.

## 6. Processing Recommendations

### Welding:

- VT1-0 / Grade 2, VT1-00 / Grade 1: GTAW (TIG) with non-consumable electrode; SAW for automated thick-section welding.
- VT6 / Grade 5: Inert-gas welding with preheat to 150-200°C; filler metal ER Ti-5 (VT6sv equivalent) required.
- OT4 / OT4-1: Unrestricted welding with excellent weld pool fluidity.

### Forming:

- VT1-0 / Grade 2: Minimum bend radius = 4x thickness for cold forming (2 mm sheet = 8 mm radius).
- VT6 / Grade 5: Hot forming recommended at 600-700°C with subsequent stress-relief anneal.

### Corrosion Protection:

- Titanium exhibits exceptional inherent corrosion resistance; however, galvanic isolation from dissimilar metals (steel, aluminum) is required using PTFE or elastomeric gaskets to prevent galvanic corrosion.

## 7. Terms of Supply and Contact Information

### Standard Supply Terms:

- Minimum order quantity (MOQ): 50 kg for stock items; 500 kg for mill-direct production.
- Lead times: 15-25 days for stock items; 45-90 days for mill production.

- Payment terms: 30-50% advance, 50-70% balance upon readiness for shipment; L/C at sight available.
- Shipping configuration: Coils, timber-skidded pallets, 20'/40' containers or flat-rack for oversize plate.
- Incoterms 2020: EXW, FCA, CIP, DAP, DDP (select destinations).

**Contact Information:**

- Client Services Department:
- WhatsApp: +86 132 50100874
- Telegram: @China\_metal\_supply
- Email: zakaz@metal-asia.pw
- Official Website: [www.metal-asia.pw](http://www.metal-asia.pw)

**Author:** [Milosh Kovachevi](#) -- Technical Director for Metallurgical Procurement, Metal-Asia.pw.

---

*Metal-Asia.pw provides integrated procurement of titanium alloy products from China, including RFQ/RFP response support for government and defense contracts, full Supply Chain Compliance management (ITAR/EAR/REACH/DFARS), Pre-Shipment Inspection (NDT, UT, chemical verification), and turnkey customs clearance. For a comprehensive overview of our service portfolio, visit [www.metal-asia.pw](http://www.metal-asia.pw).*

*This commercial supply proposal is provided for informational purposes and does not constitute a binding offer. Specific terms (pricing, lead times, volumes) are determined individually through a Supply Agreement and associated Purchase Order.*