Commercial Supply Proposal

Titanium Rods and Round Bars

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 & Aero-engines, Marine & Shipbuilding, Space Systems, Precision Engineering, Power Generation, Medical Technology (Orthopedics and Dental), Food Processing Equipment, Chemical Processing Machinery

1. Product Description and Technical Parameters

Titanium round bar (rod) represents a versatile semi-finished product used for the manufacture of precision-machined components, high-strength fasteners, shafts, axles, surgical instruments, implants, and process equipment elements. Bar production is achieved through hot rolling, forging, extrusion, drawing, and centerless grinding to achieve the required dimensional accuracy and surface finish.

1.1. Classification by Manufacturing Method

Manufacturing Method	Diameter, mm	Length, mm	Standard	Alloy Grades	Application
Hot-rolled round bar	10-150	500-6000	ASTM B348, AMS 4928, GOST 26492-85, OST 1-90173-75	VT1-0/Gr2, VT3-1, VT5, VT5-1, VT6/Gr5, VT8, VT9, VT14, VT20, VT22, OT4, OT4-0, OT4-1, PT-3V, PT-7M	Machining blanks, shafts, spindles
Forged round bar	22-350 (round); 110-300 (square)	1000-4000	ASTM B381, AMS 4921, OST 1-90107-73	VT1-00/Gr1, VT1-0/Gr2, OT4-0, OT4-1, VT5-1, VT5, VT6S, VT6/Gr5, VT3-1, VT8, VT9, VT14, VT20, VT22	Heavy-duty components, crankshafts, connecting rods

Manufacturing Method	Diameter, mm	Length, mm	Standard	Alloy Grades	Application
Extruded bar	15-100	1500-5000	ASTM B348, OST 1-92020-82	VT1-0/Gr2, VT6/Gr5, OT4	Complex profile blanks, die components
Cold-drawn (calibrated) bar	4-16.2	500-6000	ASTM B348 (precision), OST 1-90201-75	VT1-0/Gr2, OT4, VT6/Gr5, VT16	High-precision parts, fasteners, pins, axles
Ground and polished bar	10-61	1000-3000	ASTM F136, ISO 5832-3, TU 1-92-117	VT1-0/Gr2, VT6/Gr5, OT4	Implants, surgical instruments, precision shafts
Marine-grade bar	10-150	up to 4000	ASTM B348, OST 1-92062-90	VT1-0/Gr2, PT-3V, PT-7M	Propeller shafts, struts, guides
Nuclear-grade bar	8-22; 70-350	up to 3000	ASTM B348, OST 5.9994-86, TU 1825-571	VT-16, VT3-1, PT-3V, 2V, VT1-0/Gr2, 3M, VT6/Gr5, VT6S, VT9, OT4, OT4-1	Reactor internals, fuel assembly components
Rectangular section bar	150x250x3000	per order	AMS 2380, ISO 5832-3	Ti-6Al-4V, Ti-6Al-7Nb	Premium implant stock

1.2. Alloy Grades and Characteristics

Grade	Alloy Type	UTS (sigma_B), MPa	Yield (sigma_0.2), MPa	Elongation (delta), %	Hardness HB	Key Features
VT1-0 / Grade 2	CP Titanium	>= 343	>= 294	>= 25	<= 140	Biocompatibility, universal corrosion resistance
VT1-00 / Grade 1	High-Purity Ti	>= 294	>= 196	>= 30	<= 120	Maximum ductility, anodizing quality
VT3-1	Heat-Resistant	>= 932	>= 833	>= 8	280-340	Service to 450°C, high

Grade	Alloy Type	UTS (sigma_B), MPa	Yield (sigma_0.2), MPa	Elongation (delta), %	Hardness HB	Key Features
	Alpha+Beta					fatigue strength
VT5	Structural Alpha	>= 686	>= 588	>= 12	240-290	Good weldability, medium strength
VT5-1	Structural Alpha	>= 686	>= 588	>= 12	240-290	Enhanced heat resistance
VT6 / Grade 5	Structural Alpha+Beta	>= 900	>= 830	>= 8	310-350	~50% of global titanium market, strength-to-weight optimum
VT6S / Grade 5 ELI	High-Purity Grade 5	>= 830	>= 760	>= 10	290-330	Enhanced toughness, cryogenic properties
VT8	Heat-Resistant Alpha+Beta	>= 932	>= 833	>= 8	300-340	Long-term service to 500°C
VT9	Heat-Resistant Alpha+Beta	>= 1079	>= 981	>= 6	330-370	Service to 550°C, compressor blades
VT14	Structural Alpha+Beta	>= 883	>= 785	>= 8	280-320	High hot-strength, stable properties
VT16	Fastener Alloy	>= 833	>= 735	>= 10	270-320	Hot heading, fatigue resistance
VT20	Heat-Resistant Alpha+Beta	>= 931	>= 833	>= 6	300-340	Aero-engine components, combustors
VT22	Ultra-High-Strength Alpha+Beta	>= 1079	>= 980	>= 6	340-380	Critical structural elements
VT23	Ultra-High-Strength Alpha+Beta	>= 1100	>= 1000	>= 5	350-390	Extruded components, landing gear
VT25	Creep-Resistant	>= 980	>= 880	>= 6	320-360	Gas turbine components,

Grade	Alloy Type	UTS (sigma_B), MPa	Yield (sigma_0.2), MPa	Elongation (delta), %	Hardness HB	Key Features
	Alpha+Beta					fasteners
OT4	Medium Alpha	>= 588	>= 441	>= 15	200-250	Excellent weldability and formability
OT4-0	Low-Alloy Alpha	>= 441	>= 343	>= 20	160-200	Deep drawing, no-prep welding
OT4-1	Medium Alpha	>= 539	>= 441	>= 15	180-230	Medium-strength welded structures
PT-3V	Marine Alpha	>= 686	>= 588	>= 12	220-270	Fatigue resistance in seawater
PT-7M	Welding Alpha	>= 490	>= 343	>= 18	180-220	Maximum ductility

1.3. Color Code Marking (GOST 2171-90 / Industry Practice)

Grade	Primary Band	Secondary Band (End Face)
VT1-00 / Grade 1	Yellow ring	White + black
VT1-0 / Grade 2	Yellow ring	White
OT4-0	Yellow ring	Green + white
OT4-1	Yellow ring	Green + black
OT4	Yellow ring	Green
VT5-1	Yellow ring	Yellow
VT6 / Grade 5	Yellow ring	Brown + blue
VT6S / Grade 5 ELI	Yellow ring	Brown + blue
VT3-1	Yellow ring	Red
VT8	Yellow ring	Blue
VT9	Yellow ring	Light blue
VT14	Yellow ring	Black + red
VT20	Yellow ring	Black + yellow
VT22	Yellow ring	Black + yellow

1.4. Manufacturing Accuracy and Surface Quality

Accuracy Class	Diameter, mm	Diameter Tolerance	Surface Roughness Ra, um	Application
Standard	10-61	h11	<= 6.3	General engineering
Enhanced	10-61	h9	<= 3.2	Precision engineering
High (P)	10-61	h8	<= 1.6	Instrumentation, medical
Ground	10-61	h7	<= 0.8	Bearings, precision shafts
Polished	10-30	h6	<= 0.4	Implants, surgical tools

2. Buyer Pain Points: Direct Import from China

Pain Point	Detail	Consequence
Macrostructure Non-Conformance	Macroporosity, shrinkage cavities, non-metallic inclusions exceeding GOST 26492-85 Grade 5 / ASTM B348 acceptance criteria	Incoming UT rejection, machining scrap, cracking during heat treatment
Dimensional Tolerance Stack-Up	Actual bar diameter 10.3 mm against ordered 10 (+0.1/-0.3) mm, forcing excessive machining stock	Increased tool wear, longer cycle times, lower material yield ratio
Improper Heat Treatment	Vendor ships VT6/Grade 5 bar in undefined condition (annealed vs. STA) leading to unpredictable machining parameters	Tool insert breakage, surface finish variation, requirement for additional annealing cycle
Alloy Grade Substitution	Material sold as VT6/Grade 5 with sub-standard aluminum content (5.0% vs. 6.0% specified), reducing UTS by 15%	Component failure in service, liability exposure, warranty claim
Packaging and Storage Deficiency	Bars shipped without corrosion inhibitor coating, exhibiting contact corrosion from steel strapping	Surface reclamation grinding, oxide scale removal, supplementary crack inspection
Absence of Radiological Certification	Nuclear applications require radiological clearance per heat; Chinese vendor lacks NQA-1 or equivalent nuclear QA program	Rejection by nuclear utility, requirement for re-melting or return
Extended Re-Qualification Cycles	Change of manufacturing plant in China triggers re-qualification under buyer's approved supplier list (ASL)	6-12 month production hiatus, carrying cost of inventory, schedule penalties

3. Metal-Asia.pw Solution for Bar Supply

3.1. Multi-Level Quality Control

- **Chemical Analysis:** OES + XRF per heat lot with ASTM B348 / GOST 19807-91 conformance protocol.
- **Ultrasonic Testing (UT):** Per ASTM E2375 / GOST 14782-86 for internal defects (cracks, cavities, inclusions).
- **Macro and Microstructural Analysis:** Grain size assessment per ASTM E112 / GOST 21058.1-75; phase ratio analysis for alpha+beta alloys.
- **Mechanical Testing:** Tensile, Charpy impact, hardness.
- **Medical-grade bars:** Biocompatibility per ISO 10993, ferromagnetic inclusion screening, Fe/Ni/Cr trace impurity control (<0.05% each).

3.2. Logistics and Certification

- Direct mill contracts with ISO 9001, AS9100, and NADCAP-accredited producers.
- Packaging: VCI corrosion protection (VDW-32), timber crates with securement, marking per ASTM B348 / GOST 14192-96.
- Delivery to major industrial centers worldwide with full customs documentation.

3.3. Aerospace and Defense Procurement Support

- Full heat-lot traceability documentation for DFARS compliance.
- Source inspection witness (SIW) coordination at mill for critical aerospace applications.
- Supplier corrective action request (SCAR) management and deviation waiver processing.
- Warranty: 18-month replacement guarantee for non-conforming material.

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4. Product Range: Titanium Rods and Round Bars

Product Description	Alloy Grades	Diameter / Section, mm	Length, mm	Standard	Industry
Hot-rolled round bar	VT1-0/Gr2, OT4, VT6/Gr5	10-22; 70-350	1000-6000	ASTM B348, AMS 4928, OST 1-90173-75	General engineering
Forged round bar	VT1-0/Gr2, VT6/Gr5, VT20, PT-3V	22-70; 115-350	1000-4000	ASTM B381, AMS 4921, OST 1-90107-73	Heavy engineering
Extruded bar	VT1-0/Gr2, VT6/Gr5, OT4	15-100	1500-5000	ASTM B348, OST 1-92020-82	Die components
Cold-drawn (calibrated) bar	VT1-0/Gr2, VT16, OT4	4-16.2	500-6000	ASTM B348, OST 1-90201-75	Fasteners, pins, axles

Product Description	Alloy Grades	Diameter / Section, mm	Length, mm	Standard	Industry
Ground bar	VT1-0/Gr2, VT6/Gr5	10-61	1000-3000	ASTM B348, TU 1-805-042	Shafts, spindles
Polished bar (medical)	VT1-00/Gr1, Ti-6Al-4V ELI	6-30	1000-3000	ASTM F136, ISO 5832-3	Implants, instruments
Forged square bar	VT1-0/Gr2, VT6/Gr5, OT4	110-300	1000-4000	ASTM B381, OST 1-90107-73	Forging blanks
Fastener stock (heading quality)	VT16, VT6/Gr5	10-30	1000-3000	ASTM B348, OST 1-90202-75	Aerospace bolts, nuts, studs
Nuclear-grade bar	VT-16, PT-7M, 3M	8-22; 70-350	up to 3000	ASTM B348, OST 5.9994-86, TU 1825-585	Nuclear engineering
Rectangular section bar	Ti-6Al-4V, Ti-6Al-7Nb	150x250x3000	3000	AMS 2380, ISO 5832-3	Premium implants
Hexagonal bar	VT1-0/Gr2, VT6/Gr5, OT4	Side 8-17	500-3000	ASTM B348, OST 1-90107-73	Nuts, fittings

5. Customs Classification and HS Codes

HS Code	Description	Duty Rate	VAT/GST	Notes
8108.90.30.10	Bars for aero-engines	0% with export license	Exempt	ITAR/EAR license required
8108.90.30.80	Bars, other	Per destination tariff	Per local regulation	ASTM/GOST conformance certificate
8108.20.00.60	Titanium ingots (remelt stock)	Standard rate	Per local regulation	For remelting
8108.20.00.70	Titanium slabs	Standard rate	Per local regulation	Intermediate blank

6. Processing Recommendations

Machining:

- VT1-0/Grade 2: Turning at V=40-60 m/min, feed 0.1-0.2 mm/rev, WC-Co carbide inserts.

- VT6/Grade 5: Reduce speed to 15-25 m/min, flood coolant (5-8% emulsion), TiAlN-coated inserts essential.

Heat Treatment:

- VT6/Grade 5 anneal: Heat to 750-800°C, hold 1-2 h, furnace cool.
- VT6/Grade 5 STA: Solution treat 850-900°C, water quench + age 480-520°C / 4 h.

Welding:

- VT1-0/Gr2, OT4: GTAW, GMAW without restriction.
- VT6/Gr5: Argon-shielded welding with VT6sv filler, preheat to 150°C.

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7. Terms of Supply and Contact Information

Standard Supply Terms:

- MOQ: 30 kg (stock items); 300 kg (mill production).
- Lead times: 12-25 days (stock); 40-80 days (mill production).
- Packaging: VCI film, timber crates, galvanized strapping.
- Incoterms 2020: EXW, FCA, CIP, DAP, DDP (select destinations).

Contact Information:

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