Commercial Proposal No. CP-2026/C350/AERO

Global Procurement of Ultra-High-Strength Maraging Steel C350 (AMS 6515/6516), Titanium Alloys & Aerospace-Grade Materials from China

---

From: Metal-Asia (metal-asia.pw) — Direct-source special alloys and aerospace material procurement
To: Aerospace and defense manufacturers, precision tool makers, motorsport engineering firms, medical implant manufacturers, research institutions
Date: April 2026
Format: B2B — Controlled supply with full NADCAP-equivalent certification and NDT inspection

---

1. Maraging 350 — Steel That Redefines Strength Limits

When Metal-Asia received its first inquiry for maraging steel C350, one number stood out: **tensile strength of 2413 MPa (350 ksi)**. For context, standard structural steel S355 achieves 510–680 MPa. Maraging C350 is **3.5–4× stronger** — while simultaneously maintaining ductility, impact toughness, and weldability that quenched alloy steels cannot match.

Maraging steels (from "martensitic aging") represent a unique metallurgical class. Unlike conventional steels, they are not carbon-based but **nickel-based**. Their extraordinary strength is achieved not through carbon (which causes brittleness), but through the precipitation of intermetallic compounds in a martensitic matrix during thermal aging at 480–540°C.

Maraging 350 (C350, AMS 6515) is the flagship of this family. Deployed where failure is not an option: rocket motor casings, fighter landing gear, precision gearboxes, high-pressure die casting tools, and Formula 1 drivetrain components.

Special alloys catalog

---

2. Supply Chain Risk Management — Ultra-High-Strength Alloy Procurement

Risk 1: Alloy Counterfeiting — "C350 Turned Out to Be 30CrMnSiA"

Manifestation: The supplier declares C350 but delivers high-strength alloy steel (e.g., 30CrMnSiA or 40CrNi2MoA). After heat treatment, the material appears similar — high hardness, polished surface. But tensile strength reaches only 1,400–1,600 MPa instead of the specified 2,400 MPa, and elongation at break is 3–5% instead of 7–8%.

Compliance Solution:

- Mandatory chemical analysis for Ni (18.0–19.5%) and Co (11.0–12.5%) — this composition is unique to C350
- Mechanical property verification after standard aging: UTS ≥ 2,310 MPa, elongation ≥ 6%, impact toughness ≥ 20 J

- Microstructural examination on metallurgical microscope — martensite with uniformly distributed Ni_3Ti and Ni_3Mo precipitates
- Heat certificate with AMS 6515 traceability

Risk 2: Incorrect Heat Treatment Condition

Manifestation: Customer receives material in solution-annealed condition (hardness ~30 HRC) but does not realize that aging treatment (480–510°C for 3–6 hours) is required to achieve maximum strength. The customer machines the part, attempts to age it, and obtains unpredictable properties.

Compliance Solution: Metal-Asia supplies in two conditions: (1) Solution-annealed (for subsequent machining and final aging by customer); (2) Fully finished (solution-annealed + aged) with heat treatment certificate. Aging process card with precise temperature, time, and cooling rate parameters provided.

Risk 3: Microporosity and Internal Defects

Manifestation: During machining or radiographic inspection, gas porosity, non-metallic inclusions, or laminations are detected. For aerospace components, this is categorically unacceptable.

Compliance Solution: Supply exclusively from mills using **VIM (Vacuum Induction Melting) + VAR (Vacuum Arc Remelting)**. Double vacuum remelting ensures metal cleanliness: gas content (H, O, N) below 10 ppm, non-metallic inclusions not exceeding 5 µm. Every heat with ultrasonic testing (UT) certificate per AMS-STD-2154 Class A.

Risk 4: Export Control Compliance

Manifestation: Maraging steel C350 is subject to international export control regimes (Wassenaar Arrangement, MTCR). Incorrect export license preparation in China causes 2–4 month cargo delays or seizure.

Compliance Solution: Full export control management. End-User Certificate (EUC) preparation, end-use statement, non-military application declaration. Metal-Asia works exclusively with licensed Chinese exporters (MOFCOM export license).

Risk 5: Customs Clearance for Strategic Alloys

Material	HS Code	Duty Range	Notes
Maraging C350 (bar/rod)	**7228.30**	EU: 0–5%*	Other alloy steel bars
Maraging C350 (plate/sheet)	**7228.50**	EU: 0–5%*	Other alloy steel flat
Titanium alloys (Ti-6Al-4V, CP Ti)	**8108.90**	EU: 0–3%*	Titanium and articles thereof
Nickel alloys (Inconel 718, 625)	**7508.90**	EU: 0–3%*	Other nickel articles
Cobalt alloys (Haynes, Stellite)	**8105.90**	EU: 0–3%*	Other cobalt articles

*Rates vary by destination and end-use certification. Aerospace end-use may qualify for duty relief under certain trade agreements.

Tool steel catalog

3. Complete Technical Specification — Maraging 350 (C350)

3.1. Chemical Composition

Element	Content, %	Metallurgical Function	Tolerance
Nickel (Ni)	**18.00–19.50**	**Base alloy; martensitic matrix**	±0.5
Cobalt (Co)	**11.00–12.50**	**Precipitation acceleration; strength**	±0.5
Molybdenum (Mo)	**4.60–5.20**	**Mo-enriched zone formation; strength**	±0.2
Titanium (Ti)	**1.30–1.60**	**Ni_3Ti precipitation — primary strengthener**	±0.1
Aluminium (Al)	0.05–0.15	Deoxidation; grain control	±0.05
Carbon (C)	≤ 0.030	Minimized for toughness retention	—
Manganese (Mn)	≤ 0.10	Residual element	—
Silicon (Si)	≤ 0.10	Residual element	—
Phosphorus (P)	≤ 0.010	Brittleness minimization	—
Sulfur (S)	≤ 0.010	Brittleness minimization	—
Zirconium (Zr)	≤ 0.020	Grain size control	—
Boron (B)	≤ 0.003	Hardenability improvement	—
Iron (Fe)	Balance	Matrix	—

Key C350 identifier vs. C250/C300: Cobalt content 11–12.5% (C250: 7.0–8.5%, C300: 8.5–9.5%). High cobalt content is the guarantee of tensile strength > 2,400 MPa.

3.2. Mechanical Properties — After Standard Aging

Heat Treatment: Solution anneal at 820°C (1 hour) + air cool → Age at 480°C (3 hours) + air cool.

Property	AMS 6515 Requirement	Typical Values	Test Method
Tensile strength (UTS)	≥ 2,275 MPa (330 ksi)	2,350–2,450 MPa	ASTM E8
Yield strength (0.2%)	≥ 2,155 MPa (312 ksi)	2,200–2,300 MPa	ASTM E8
Elongation	≥ 6%	7–9%	ASTM E8
Reduction of area	≥ 35%	40–55%	ASTM E8
Charpy V-notch impact	≥ 14 J (10 ft-lb)	18–30 J	ASTM E23
Hardness Rockwell C	53–59 HRC	55–58 HRC	ASTM E18
Brinell hardness	—	550–600 HB	ASTM E10
Modulus of elasticity	—	185–195 GPa	ASTM E111

Property	AMS 6515 Requirement	Typical Values	Test Method
Density	—	8.05–8.10 g/cm³	—

3.3. Maraging Steel Family Comparison

Parameter	C250 (AMS 6512)	C300 (AMS 6514)	C350 (AMS 6515)	C400 (Experimental)
Ni	17.0–19.0%	18.0–19.0%	**18.0–19.5%**	12.0–14.0%
Co	7.0–8.5%	8.5–9.5%	**11.0–12.5%**	12.0–14.0%
Mo	4.6–5.2%	4.6–5.2%	**4.6–5.2%**	10.0–12.0%
Ti	0.30–0.50%	0.50–0.80%	**1.30–1.60%**	1.5–2.0%
UTS	≥ 1,750 MPa	≥ 2,050 MPa	**≥ 2,275 MPa**	≥ 2,750 MPa
Elongation	≥ 8%	≥ 7%	**≥ 6%**	≥ 4%
Cost index (relative)	Baseline	+15–20%	**+30–40%**	+60–80%
Application	General purpose	Aerospace, rockets	**Rocket casings, landing gear, gears**	Experimental

3.4. Thermal Properties

Property	Value	Units	Notes
Solution annealing temperature	820 ± 10	°C	1 hour, vacuum or protective atmosphere
Optimal aging temperature	480 ± 5	°C	3 hours, air cool
Alternative aging (higher toughness)	510 ± 5	°C	6 hours — improved toughness, slight strength reduction
Onset of precipitation	~400	°C	Hardness begins to increase
Overaging threshold	> 600	°C	Precipitate coarsening; strength loss
Coefficient of thermal expansion	11.3	µm/(m·°C)	20–480°C
Thermal conductivity	25.3	W/(m·K)	At 20°C
Aging shrinkage	0.04–0.06	%	Must be factored into machining allowance

3.5. Fabrication & Processing Parameters

Operation	Parameters	Recommendations
Machining (before aging)	Hardness ~30 HRC	Standard HSS tooling; cutting parameters as for 4140 steel
Machining (after aging)	Hardness 55–58 HRC	Carbide tooling (WC-Co); cutting speed 30–50 m/min
Grinding	Diamond wheels	Mandatory coolant — overheating above 200°C reduces strength
Welding	TIG, MIG, electron beam	No preheat required; matching C350 filler; post-weld aging mandatory
Post-weld aging	480°C, 3 hours	Restores strength in heat-affected zone
Polishing	Diamond paste	Ra 0.1–0.4 µm for die casting tools
Etching	HNO_3 + HF	Microstructure quality control
Nitriding	450°C, NH_3	Surface hardness to 70 HRC, case depth 0.1–0.3 mm

3.6. Product Range — C350 Supply Formats

Product	Dimensions	Supply Condition	Application
Round bar	Ø10–300 mm, length 1,000–6,000 mm	Solution annealed or Aged	Shafts, axles, spindles, bolts
Square bar	10×10–150×150 mm, length 1,000–3,000 mm	Solution annealed or Aged	Stamping dies, tooling inserts
Flat bar	Thickness 10–100 mm, width 50–400 mm	Solution annealed or Aged	Guide rails, wear strips
Plate / sheet	Thickness 2.0–100 mm, up to 1,500×4,000 mm	Solution annealed or Aged	Die bases, mold sidewalls
Forging	Per customer drawing, weight to 500 kg	Solution annealed + rough machined	Gearbox housings, structural frames
Wire	Ø0.5–12 mm, on spools	Solution annealed or Aged	Welding filler, springs, reinforcement
Tube hollows	Ø30–200 mm, wall 5–30 mm	Solution annealed	Sleeves, bushings, housings
Metal powder (3D printing)	Particle size 15–53 µm	Gas atomized	Additive manufacturing

Custom specification orders

---

4. Titanium Alloys

4.1. Ti-6Al-4V (Grade 5) — Technical Specification

Parameter	Value	Standard
Composition	Al 5.5–6.75%, V 3.5–4.5%, Fe ≤ 0.30%, O ≤ 0.20%, Ti balance	ASTM B348, AMS 4928
Tensile strength	≥ 895 MPa (130 ksi)	ASTM E8
Yield strength (0.2%)	≥ 825 MPa (120 ksi)	ASTM E8
Elongation	≥ 10%	ASTM E8
Modulus of elasticity	110–115 GPa	ASTM E111
Density	4.43 g/cm³	—
Operating temperature	–196°C to +400°C	—
Weldability	Good (TIG, EBW, laser)	—

4.2. Titanium Alloy Product Range

Alloy	Standard	Supply Form	Application
Ti-6Al-4V (Grade 5)	ASTM B348, AMS 4928	Round, sheet, forging, wire	Aerospace, defense, implants, sport
Ti-6Al-4V ELI (Grade 23)	ASTM B348, AMS 4930	Round, sheet	Medical implants, cryogenics
Ti-5Al-2.5Sn (Grade 6)	ASTM B348, AMS 4926	Round, sheet	Cryogenic vessels, rocket components
Grade 2 (CP Titanium)	ASTM B265, ASTM B348	Sheet, tube, wire	Chemical processing, cladding
VT6 (Ti-6Al-4V)	GOST 19807	Round, forging, sheet	CIS aerospace programs
VT23 (Ti-5Al-5Mo-5V-3Cr)	GOST 19807	Round, forging	High-load aviation components
Ti-6Al-7Nb (Grade 36)	ASTM F1295	Round, sheet	Medical implants (biocompatibility)
Ti-6Al-4V (Ti64)	AMS 4928	Bar, billet, forging	Commercial aerospace (Boeing, Airbus)

4.3. Ti-6Al-4V vs. Competitive Materials

Parameter	Ti-6Al-4V	Aluminum 7075-T6	Steel C350	Stainless 17-4PH
Density, g/cm³	4.43	2.81	8.08	7.80
Tensile strength, MPa	900	570	2,400	1,310
Specific strength (strength/density)	**203**	203	297	168
Modulus of elasticity, GPa	114	72	190	197
Max temperature, °C	400	120	450	315
Seawater corrosion	Excellent	Poor	Good (coated)	Good
Cost per kg	High	Low	Very high	Medium
Best application	**Aircraft where weight is critical**	**Lightweight structures**	**Ultra-high loads**	**Corrosion-resistant parts**

Stainless steel products

---

5. Application Domains — Maraging C350

5.1. Aerospace & Defense

Component	Material Requirements	Why C350
Rocket motor casing	UTS > 2,000 MPa, specific strength	20% lighter than steel at equivalent strength
Fighter landing gear	Fatigue strength, impact toughness	Withstands landing shocks without deformation
Gearbox shafts & gears	Wear resistance, contact fatigue	70 HRC surface hardness after nitriding
Fasteners (bolts, studs)	UTS > 2,200 MPa, stress relaxation < 5%	Does not loosen under vibration
Wing longerons	Specific strength, stiffness	Cost-effective alternative to titanium
Engine mount attachments	Thermo-cyclic strength to 450°C	Operates in exhaust jet zones

5.2. Defense & Armored Vehicles

Component	Requirements	Why C350
Munition casings	Strength, ballistic consistency	Property repeatability ±2%
Armored vehicle components	Specific strength, weldability	Weldable structures without quench cracking
Gun barrel liners	Wear resistance, strength	+40% barrel life vs. conventional steels

5.3. Tool & Die Manufacturing

Component	Requirements	Why C350
Aluminum die casting dies	Thermal fatigue, dimensional stability	0.05% aging shrinkage — minimal
Stamping dies	Impact toughness, wear resistance	Does not fracture under impact
Extrusion dies	Strength at 400–450°C	Outperforms H13 without cooling
Plastic injection molds	Polishability, corrosion resistance	Ra < 0.05 µm after polishing

5.4. Motorsport

Component	Requirements	Why C350
F1 connecting rods & piston pins	Specific strength, fatigue resistance	30% lighter than titanium at 2,400 MPa
Racing drivetrain shafts	Torsional stiffness, strength	Minimal backlash, instantaneous response
Premium bicycle frames	Lightweight + strength	800-gram frame with 500 kg bending strength

5.5. Medical (Emerging)

Component	Requirements	Why C350
Surgical instruments (specialized)	Corrosion resistance, hardness	Alternative to 440C where welding is required
Prosthetic components (research)	Biocompatibility, fatigue strength	Ongoing research programs

6. Terms of Supply & Pricing

Parameter	Terms
Incoterms 2020	FOB Shanghai/Baotou/Dalian, CIF Rotterdam/Hamburg/Houston

Parameter	Terms
MOQ	50 kg (bar Ø20–100 mm), 100 kg (plate), 20 kg (wire)
Lead time	30–45 days (standard), 45–75 days (non-standard)
Payment	50% deposit, 50% before shipment (high-value material)
Certification	MTC EN 10204 3.2 (with inspector), chemical analysis, mechanical testing, UT
Packing	Vacuum-sealed + VCI + timber crate with cushioning
Insurance	110% of CIF
China export license	Handled by Metal-Asia (10–20 business days)

Indicative Pricing (FOB China, April 2026):

Product	Dimensions	Price/kg, USD
C350 round bar, Solution Annealed, Ø20–50 mm	L=1,000 mm	85–120
C350 round bar, Aged, Ø20–50 mm	L=1,000 mm	95–135
C350 round bar, Solution Annealed, Ø50–100 mm	L=1,000 mm	80–115
C350 plate, Solution Annealed, 10–30 mm	500×1,000 mm	90–130
C350 plate, Solution Annealed, 30–80 mm	500×1,000 mm	85–120
C250 round bar, Solution Annealed, Ø20–50 mm	L=1,000 mm	60–85
C300 round bar, Solution Annealed, Ø20–50 mm	L=1,000 mm	70–100
Ti-6Al-4V round bar, Annealed, Ø20–50 mm	L=1,000 mm	55–80
Ti-6Al-4V ELI round bar, Ø10–30 mm	L=1,000 mm	70–95
Ti-6Al-4V sheet, 2–10 mm	500×1,000 mm	65–90
Inconel 718 round bar, Solution Annealed, Ø20–50 mm	L=1,000 mm	45–65
Inconel 625 round bar, Ø20–50 mm	L=1,000 mm	40–58

Structural steel catalog

---

7. Procurement Workflow

Step	Timeline	Actions
1. RFQ	48 hours	Drawing/specification review, alloy selection, preliminary quotation
2. Quotation	48 hours	Pricing, lead time, payment terms, documentation list

Step	Timeline	Actions
3. Contract & Deposit	1–2 days	Contract execution, 50% deposit transfer
4. Production	30–75 days	Weekly reports; video call from mill if required
5. Final Inspection	2–3 days	Intertek/SGS: chemical composition, mechanical properties, dimensions, UT
6. Shipment	Per sailing	Export clearance, insurance, freight to destination

Contact for project quotation

---

8. Frequently Asked Questions

Q: Why is C350 so expensive compared to standard steel?
A: Three factors: (1) The alloy contains 18% nickel and 12% cobalt — expensive strategic elements. (2) Production requires double vacuum remelting (VIM+VAR) — energy-intensive. (3) Global producers are countable: voestalpine (Austria), Universal Stainless (USA), Nippon Koshuha (Japan), and select Chinese mills. Limited supply + unique properties = premium pricing.

Q: Can C350 be welded?
A: Yes — this is one of the key advantages of maraging steels. Due to near-zero carbon content (≤ 0.03%), C350 is not prone to quench cracking. TIG welding with matching C350 filler, no preheat required. Post-weld aging at 480°C for 3 hours is mandatory to restore strength in the heat-affected zone.

Q: What machining allowance is needed before aging?
A: Standard aging shrinkage (480°C, 3 hours) is 0.04–0.06%. For critical dimensions, allow 0.1–0.15% on diameter/thickness. Finish grind or turn after aging.

Q: Do you supply test samples for qualification?
A: Yes. Samples up to 500×500×50 mm or bar Ø30×300 mm available. Sample cost from 500 USD depending on size. Delivery 10–15 days.

Q: How to authenticate C350 on receipt?
A: Three mandatory tests: (1) Spectral analysis — must show Ni 18%+ and Co 11%+; (2) Hardness after aging — 55–58 HRC; (3) Density — 8.05–8.10 g/cm³ (standard steel: 7.85, titanium: 4.43). The combination of these three parameters uniquely identifies C350.

Technical articles & resources

Yours sincerely,
Metal-Asia Special Alloys & Aerospace Materials Division
metal-asia.pw — Certified Alloys | Export Control Managed | Global Delivery

Home | English | Blog | Contact | Shipping | Payment

SEO Clusters: maraging steel C350, maraging 350, AMS 6515, ultra high strength steel, titanium alloy Ti-6Al-4V, aerospace materials, nickel alloy Inconel, cobalt alloy, rocket motor casing steel, aircraft landing gear, precision tool steel, premium sports equipment, cryogenic materials, 2400 MPa steel, titanium Grade 5, VT6, CP titanium, special alloys from China, aerospace grade steel, NADCAP materials.