

SUPERMETALPRICE.COM

Price Methodology and Price Assessment Standards

Specialty Metals · Superalloys · Stainless Steel · Scrap

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1. Purpose and Scope

This document describes the methodology used by Super Metal Price ("SMP") to assess, report, and publish price information for specialty metals, superalloys, stainless steel, and related scrap materials.

The purpose of SMP price reporting is to provide independent, transparent, and representative market reference prices that enable buyers, traders, recyclers, alloy producers, and other specialty-metals market participants to make sound decisions.

This methodology applies to all price assessments and price reports published by SMP, including the weekly Price Reporting series, price-trend charts, moving-average calculations, and related market commentary.

1.1 Basic Principles

1. **Independence:** SMP's price assessments are conducted independently of any commercial interest. SMP does not trade the metals it covers, and editorial decisions are not influenced by advertising, sponsorship, or subscription revenue.
2. **Transparency:** This methodology is published publicly. When material changes are made to the methodology, SMP notifies subscribers in advance and documents the changes in the Methodology Change Log in Section 12.
3. **Representativeness:** Price assessments are designed to reflect the prevailing value at which a given material could actually be traded in the relevant market at the time of assessment.
4. **Consistency:** SMP applies this methodology consistently across all price assessments. Where market conditions require a departure from standard procedures, the reasons are documented in the relevant price report.

2. Metal and Alloy Coverage

SMP currently publishes weekly price reports for the following metal groups and specific grades. Coverage is expanded periodically based on subscriber demand and market liquidity.

Note: Grades marked with an asterisk (*) throughout this section are in the process of being added to coverage. The current reporting status of these grades can be confirmed on the latest Price News page.

2.1 Base Metals

Grade	Common Name / Series	Principal Applications
Ni	N/A	Alloys, coins, batteries
Cu	N/A	Heat pipes, heat-exchange catalysts, cookware, cartridge cases, copper wire, copper sheet, electrical & electronic products, bronze statues
Fe	N/A	Automotive bodies, building frames, ships, railways, computer chassis, armored vehicles
Al	N/A	High-voltage power lines, aluminum cans, cookware, aircraft, bicycle components and frames, power cables, building facades, window frames
Pd	N/A	Automotive exhaust tuning, jewelry, dental materials, connectors, switches, relays, electrical-contact plating, electrodes, semiconductors, hydrogen-storage alloys, fusion electrodes and catalysts, dental crowns
Sn	N/A	Solder, tableware, ornaments, large heavy-duty bearings, superconducting wire, glass colorants, glass strengthening agents, LCD panels
Ir	N/A	High-temperature compound semiconductors, electrical contacts, chemical catalysts, OLED phosphors, thermocouples, fountain-pen nibs
Ru	N/A	Thick-film resistors, electrical contacts, chemical catalysts, hard disk drives, turbine-blade coatings, semiconductor devices, transistors, plating
Pb	N/A	Lead-acid batteries, X-ray radiation shielding panels, cable sheathing, chemical-equipment tank lining, fishing sinkers
Zn	N/A	Galvanized steel sheet, Zamak die-cast parts, alkaline batteries, marine sacrificial anodes
Ag	N/A	Electrical contacts (switches, relays), PCB conductive paste, RF connectors
Au	N/A	Semiconductor bonding wire, electronic-connector plating, IC package contacts
Pt	N/A	Automotive catalytic converters, petrochemical catalysts, Pt-Rh thermocouples
Rh	N/A	Automotive exhaust catalysts, Pt-Rh thermocouples, electrical-contact plating

2.2 Special Metals

Grade	Common Name / Series	Principal Applications
Cr	N/A	Surface protection, decorative plating, stainless steel
Mo	N/A	Desulfurization processes, lubricants, pigments, spacecraft components,

Grade	Common Name / Series	Principal Applications
		motors, catalysts
Mo (Air)	N/A	Desulfurization processes, lubricants, pigments, spacecraft components, motors, catalysts
Mo (Ox)	N/A	Transition-metal oxides (TMO), OLEDs, organic solar cells, perovskite solar cells, catalysts, gas sensors, smart windows
Nb (Vac)	N/A	Welding rods, pipes, superconducting magnets, steel additives, automotive bodies, oil pipelines, high-temperature superalloys, combustion equipment, implants
Co	N/A	Lithium-ion batteries, alloys
W	N/A	Hard materials, alloys and steels, filaments, welding electrodes, electrical contacts, X-ray generator targets
Ti	N/A	Bicycle frames, aircraft frames, implants, ship components, heat exchangers, heating and cooling units, submarine components
Ta	N/A	Acid-resistant equipment, molds and dies, vacuum and radar tubes, vacuum-tube electrodes, capacitors, resistors, condensers
Re	N/A	Combustion chambers, turbine blades, jet engines and exhaust nozzles, catalysts, thermocouples, electrical contacts
Zr (Hf)	N/A	Nuclear reactors, space shuttles, nuclear-fuel cladding, spacecraft combustion chambers, spacecraft wings, engines, heavy-water reactor pressure tubes, bicycle frames, filaments, artificial joints, surgical instruments
V	N/A	Tools, springs, missiles, jet engines, automotive axles, crankshafts, bicycle frames, gears, high-speed cutting tools
Hf	N/A	Nuclear-submarine control rods, gas-turbine blades, plasma-cutting electrodes, insulators, blue lasers for DVD readers, optical coatings, filaments, electrodes
In	N/A	LCD TVs, laptop LCD displays, junction transistors, semiconductors, gaskets, CPU soldering, conductive adhesives, cryogenic devices, bearings
Bi	N/A	Low-melting-point alloys (fuses, safety plugs), lead-free solder, medicinal bismuth compounds
Cd	N/A	Ni-Cd rechargeable batteries, CdTe solar cells, electroplated coatings
Ga	N/A	GaN LEDs, GaAs semiconductors, high-frequency semiconductor devices
Ge	N/A	Optical-fiber cores, infrared lenses, high-speed semiconductor devices
C (Graphite)	N/A	Lithium-ion battery anode material, electrodes (EDM, electric arc furnace), high-temperature refractories (crucibles)
Li	N/A	Lithium-ion batteries, lithium-metal batteries, aluminum-alloy additive
Mg	N/A	Lightweight alloys (automotive/aerospace parts), die-cast parts, steelmaking deoxidizer
Mn	N/A	Steel-alloy additive, Zn-MnO ₂ batteries, aluminum-alloy additive
Se	N/A	CdSe/CdTe photoelectric devices, glass decolorizer, semiconductor photoelectric devices

Grade	Common Name / Series	Principal Applications
Si	N/A	Semiconductor wafers, solar cells, silicone rubber and sealants, aluminum-alloy additive
Te	N/A	CdTe solar cells, Bi-Te thermoelectric devices, steel/copper alloy additive

2.3 Rare Earths

Grade	Common Name / Series	Principal Applications
Ce (Cerium)	N/A	Automotive exhaust catalysts, glass polishing agent
Dy (Dysprosium)	N/A	NdFeB permanent-magnet additive
Er (Erbium)	N/A	Optical-fiber amplifiers (EDFA), fiber lasers
Eu (Europium)	N/A	LED red phosphor
Gd (Gadolinium)	N/A	MRI contrast agent
Ho (Holmium)	N/A	Medical Ho:YAG lasers
La (Lanthanum)	N/A	Ni-MH battery anode alloy, automotive catalytic converters
Lu (Lutetium)	N/A	PET scanner scintillators (LSO crystal)
Mm (Mischmetal)	N/A	Lighter flints (ferrocium)
Nd (Neodymium)	N/A	NdFeB permanent magnets
Pr (Praseodymium)	N/A	NdFeB permanent-magnet additive
Sm (Samarium)	N/A	SmCo permanent magnets
Tb (Terbium)	N/A	LED green phosphor, NdFeB magnet additive
Y (Yttrium)	N/A	YAG laser crystals, LED phosphors (YAG:Ce), YSZ ceramics
Yb (Ytterbium)	N/A	Fiber lasers

2.4 Base Alloys

Grade	Common Name / Series	Principal Applications
70/30 Brass	[UNS] C26000 [ASTM] B36/B36M, B134, B135	[Marine] Seawater condenser tubes, seawater heat-exchanger tubes, marine piping fittings
90/10 Cupronickel	[UNS] C70600 [ASTM] B111, B151, B171	[Marine] Seawater heat-exchanger tubes, ship condenser tubes, seawater piping
80/20 Cupronickel	[UNS] C71000 [ASTM] B111, B466, B151	[Marine] Seawater heat-exchanger tubes, seawater piping, desalination-plant tubes
70/30 Cupronickel	[UNS] C71500 [ASTM] B111, B466, B151	[Power] Power-plant condenser tubes [Marine] Seawater heat exchangers, seawater piping
Aluminum Bronze	[UNS] C95400 [ASTM] B148	[Marine] Seawater valves, pump impellers, ship propellers
Ni-Al Bronze	[UNS] C63000 [ASTM] B150	[Marine] Ship propellers, marine valves, pump impellers
Beryllium Copper	[UNS] C17200 [ASTM] B196, B197	[Electronics] Electrical contacts, springs, non-sparking tools
Nickel Silver	[UNS] C75200 [ASTM] B122	Musical-instrument parts, decorative metal parts, precision machine parts

2.5 Ferro Alloys

Grade	Common Name / Series	Principal Applications
Fe-Cr (LC)	N/A	Ball-bearing steel, automotive-component steel, carbon steel, stainless steel, corrosion-resistant steel, gears, blower blades, cutting blades
Fe-Cr (HC)	N/A	Ball-bearing steel, automotive-component steel, carbon steel, stainless steel, corrosion-resistant steel, gears, blower blades, cutting blades
Fe-Mo	N/A	Machine tools, military equipment, refinery tubes, stainless steel, heat-resistant steel, high-speed machined parts, cold-working tools, drills, screwdrivers, drill bits
Fe-Nb	N/A	Electrolytic capacitors, chemical-equipment components, cladding, alloy additive, landing gear, engine components, electric motors, generators, magnetic separators
Fe-W	N/A	Drills, electron microscopes, IC chips, welding electrodes, metal films, wiring, circuits, jet-engine turbine blades, rocket nozzles
Fe-Ti	N/A	Alloys, stainless steel, tool steel, deoxidizer, arc-welding wire, welding electrodes
FeV	N/A	Steel additive, spanners, screwdrivers, automotive components, pipes, turbine blades, aircraft-engine components, vanadium redox flow batteries, boilers,

Grade	Common Name / Series	Principal Applications
		pressure vessels, crankshafts, ball bearings
Fe-B	N/A	Automotive high-strength structural steel sheet (boron steel), high-strength heat-treatable component steel, spring steel, wear-resistant machine-component steel
Fe-Mn	N/A	Rail steel, high-strength structural steel (HSLA steel), manganese-steel wear-resistant parts, structural steel for construction
Fe-Si	N/A	Electrical steel sheet for transformers, motor-core steel, deoxidizer-treated cast-iron castings, cast-iron microstructure improvement material

2.6 Special Alloys

Grade	Common Name / Series	Principal Applications
Inconel 600	[UNS] N06600 [ASTM] B163, B166, B167, B168, B366, B516, B517, B564, B906 [SAE] AMS 5665, AMS 5540, AMS 5580 [ASME] SB166, SB564, SB168, SB906, SB167, SB163, SB516, SB517, SB751, SB775, SB829	[Aerospace] Exhaust liners, turbine seals, engines, airframe components, combustion-can liners [Chemical] Stills, condensers, heat exchangers, condensing tubes [Electronics] Cathode-ray tubes
Inconel 601	[UNS] N06601 [ASTM] B166, B168, B775, B829, B167, B751 [ASME] SB166, SB168, SB167, SB751, SB775, SB829	[Marine] Propeller shafts, fasteners [Chemical] Process vessels, valves, heat exchangers, boiler feedwater heaters [Aerospace] Turbine-engine igniters, combustion-can liners, diffuser assemblies
Inconel 617	[UNS] N06617 [ASTM] B166, B168, B546 [SAE] AMS 5887, AMS 5888, AMS 5889 [ASME] SB166, SB168, SB546	[Aerospace] Gas turbines, exhaust ducts, combustion cans, transition liners [Chemical] Heat exchangers, high-temperature gas pipes, high-temperature piping
Inconel 625 (VM)*	[UNS] N06625 [ASTM] B166, B446, B168, B906, B443, B444, B167, B829, B517, B775, B516, B751, B704, B705, B366, B472, B564 [SAE] AMS 5581	[Aerospace] Rocket-engine combustion-chamber tubes, compressor vanes, turbine seals, rocket thrust-chamber tubing, aero engines [FGD] Absorption towers, reheaters, flue-gas inlet baffles, fans, agitators, deflectors [Chemical] Piping, valves, reactors, heat exchangers, heat-exchanger tubes [Marine] Submarine communication cables, submarines, exhaust ducts, bellows for subsea control equipment
Inconel 625 (AM)*	[UNS] N06625 [ASTM] B166, B446, B168, B906, B443, B444, B167, B829, B517, B775, B516, B751, B704, B705, B366, B472, B564 [SAE] AMS 5581	[Aerospace] Rocket-engine combustion-chamber tubes, compressor vanes, turbine seals, rocket thrust-chamber tubing, aero engines [FGD] Absorption towers, reheaters, flue-gas inlet baffles, fans, agitators, deflectors [Chemical] Piping, valves, reactors, heat exchangers, heat-exchanger tubes [Marine] Submarine communication cables, submarines, exhaust ducts, bellows for subsea control equipment
Inconel 690	[UNS] N06690 [ASTM] B166, B564, B168, B163, B167, B829 [ASME] SB166, SB564, SB168, SB163, SB829	[Chemical] Steam-generator tubes, pipes, baffles, heat exchangers, steam generators [Petrochemical] Furnaces, reheaters, incinerators, burners, ducts [Nuclear Power] Steam generators, reactor core components
Inconel 713LC	[UNS] N07713	[Aerospace] Turbine rotor blades, turbine guides, turbine vanes, exhaust systems [Power] Combustor cans, transition ducts, reactor components [Automotive] Turbocharger rotors [Oil & Gas] Drilling and wellhead equipment [Chemical] Reactors, heat exchangers [Marine] Propellers and shafts
Inconel 718 (VM)*	[UNS] N07718 [ASTM] B637, B670, B906, B983, F2281 [SAE] AMS 5662, AMS 5663, AMS 5664, AMS 5832, AMS 5914, AMS 5962, AMS 5596, AMS 5597, AMS 5589, AMS 5590 [ASME] SB637, SB670	[Aerospace] Gas-turbine components, jet engines, liquid-fuel rocket motors, bolts, fasteners, shafts, blades, cases, nozzles, seals, spacers [Chemical] Pumps, cryogenic storage tanks, heat exchangers, reaction vessels [Automotive] Turbocharger rotors, exhaust

Grade	Common Name / Series	Principal Applications
		manifolds, valves [Oil & Gas] Downhole tools, valves, wellhead components, well lines, instrumentation
Inconel 718 (AM)*	[UNS] N07718 [ASTM] B637, B670, B906, B983, F2281 [SAE] AMS 5662, AMS 5663, AMS 5664, AMS 5832, AMS 5914, AMS 5962, AMS 5596, AMS 5597, AMS 5589, AMS 5590 [ASME] SB637, SB670	[Aerospace] Gas-turbine components, jet engines, liquid-fuel rocket motors, bolts, fasteners, shafts, blades, cases, nozzles, seals, spacers [Chemical] Pumps, cryogenic storage tanks, heat exchangers, reaction vessels [Automotive] Turbocharger rotors, exhaust manifolds, valves [Oil & Gas] Downhole tools, valves, wellhead components, well lines, instrumentation
Inconel 718+	[UNS] N07818	[Aerospace] Fasteners, blades, aircraft-engine disks, gas-turbine engine components, turbine casings, combustors
Inconel 722	[UNS] N07722 [ASTM] B637, B670 [ASME] SB564	[Aerospace] Airframes, cases, flanges, turbine blades [Oil & Gas] Drills, downhole tools [Chemical] Reactors, heat exchangers, piping
Inconel 738LC	[UNS] N07738 [ASTM] A494 [SAE] AMS 5390, AMS 5391	[Aerospace] Compressors, turbine and exhaust-system rings, casings, combustors, turbine blades, high-temperature fasteners [Petrochemical] Reactors, heat exchangers, reaction vessels, piping
Inconel X-750	[UNS] N07750 [ASTM] B637 [SAE] AMS 5667-5671, AMS 5747, AMS 5542, AMS 5598, AMS 5699 [ASME] SB637	[Aerospace] High-temperature springs, bolts, gas-turbine blades, rocket engines, high-pressure vessels, gas turbines, rotor blades, rotor wheels
Inconel 783	[UNS] R30783	[Aerospace] Turbine seals, turbine cases, turbine rings, compressors, combustors, turbine blades, afterburner components [Chemical] Heat exchangers, reactor vessels, piping [Automotive] Turbine wheels, turbocharger housings
Inconel 792	[UNS] N07792	[Aerospace] Gas-turbine components, combustion chambers, exhaust systems, turbine blades, heat-resistant pipes, jet nozzles [Petrochemical] Chemical-processing plants, refineries, offshore platforms [Power] Turbine blades, heat exchangers, boiler components [Automotive] Exhaust systems, turbocharger components
Incoloy 939	[UNS] N06939 [SAE] AMS 5389, AMS 5939	[Aerospace] Jet-engine fan blades, gas-turbine blades, exhaust-system components [Oil & Gas] Downhole tools, valves, pump impellers
Incoloy 800	[UNS] N08800 [ASTM] B163, B407, B154, B515, B409, A240, A480, B408, B564 [ASME] SB163, SB407, SB515, SB751, SA240, SA480, SB408	[Power] Heat exchangers, superheaters, steam generators, reactor components, thermocouple protection tubes [Chemical] Pipe elbows, pollution-control equipment, fossil-fuel transport pipes, pickling equipment
Incoloy 825	[UNS] N08825 [ASTM] B425, B564, B424, B906, B163, B423, B704, B705, B751, B775, B829 [ASME] SB425, SB564,	[Chemical] Sulfuric-acid piping, tank vessels, phosphoric-acid evaporators, pickling tanks [Oil & Gas] Oil and gas production facilities, pipes for the oil and gas

Grade	Common Name / Series	Principal Applications
	SB424, SB906, SB423, SB163, SB704, SB705, SB751, SB775, SB829	industry
Incoloy 925	[UNS] N09925 [ASTM] B805, B637, B872, B983	[Oil & Gas] Fasteners, flange shafts, high-pressure valves, piping [Marine] Marine fasteners, pump shafts
Incoloy 901	[UNS] N09901 [SAE] AMS 5660	[Aerospace] Engine blades, exhaust ducts, turbine-engine disks, shafts [Automotive] Turbocharger housings [Medical] Implants
Incoloy 907/909	[UNS] N19907 (907), N19909 (909) [ASTM] B408 (907)	[Aerospace] Gas turbines, turbine disks, turbine blades, combustion-chamber casings, steam-turbine bolts [Marine] Drilling equipment, seawater desalination plants, submarine hulls [Power] Turbine blades, boiler tubes, heat exchangers [Chemical] Reactors, heat exchangers, piping
Hastelloy B(2)	[UNS] N10665 [ASTM] B333, B335, B622, B619, B626, B564	[Oil & Gas] Chemical reactors, degassing equipment, fasteners, flange shafts, high-pressure valves, piping [Marine] Freshwater tanks, marine fasteners, pump shafts
Hastelloy C4	[UNS] N06455 [ASTM] B575, B574, B617, B622	[Environmental] Flue-gas desulfurization plants, piping, absorbers, blowers, agitators, heat exchangers [Chemical] Heat exchangers, piping, measurement probes, centrifuges [Power] Piping, heat exchangers, gate valves, nuclear-fuel processors, reactor components, fuel-gas filters
Hastelloy C22	[UNS] N06022 [ASTM] B619, B622, B626, B575, B574, B462, B564 [ASME] SB619, SB622, SB575, SB906, SB574	[Chemical] Chemical reactors, heat exchangers [Pharmaceutical] Tanks, pipes, valves [Petrochemical] Petrochemical plants [Gas] Gas-desulfurization systems [Medical] Implants, surgical instruments, dental instruments
Hastelloy C276*	[UNS] N10276 [ASTM] B462, B574, B564, B575, B906, B622, B829, B626, B751, B619, B775 [ASME] SB574, SB564, SB575, SB906, SB622, SB829, SB626, SB751, SB619, SB775	[Aerospace] Aircraft exhaust systems, turbine-engine components [Chemical] Reactors, heat exchangers, piping [Oil & Gas] Refining equipment [Power] Desulfurization equipment, turbine exhaust systems
Hastelloy G3	[UNS] N06985 [ASTM] B581, B582, B619, B622, B626 [ASME] SB582, B619, B622, B626	[Oil & Gas] Oil-well pipes, evaporators [Nuclear] Nuclear-fuel tanks, nuclear-fuel reprocessing equipment, pickling equipment
Hastelloy G30	[UNS] N06030 [ASTM] B582, B472, B622, B462 [ASME] SB582, SB581, SB622, SB366, SB462	[Gas & Oil] Oil-well pipes, evaporators [Nuclear] Nuclear-fuel tanks, nuclear-fuel reprocessing equipment, pickling equipment
Hastelloy S	[UNS] N06635 [ASTM] B619, B622	[Chemical] Heat exchangers, reactors, piping, condensers [Aerospace] Jet-engine exhaust pipes, turbine blades, vanes [Marine] Seawater desalination plants [Power] Gas turbines, boilers
Hastelloy X	[UNS] N06002 [ASTM] B572, B435, B622, B626 [ASME] SB572, SB435, SB622,	[Aerospace] Combustor cans, transition ducts, afterburner components, rocket-engine components

Grade	Common Name / Series	Principal Applications
	SB626, SB619	[Petrochemical] Furnace baffles
Haynes 214	[UNS] N07214 [ASTM] B435, B581, B582 [SAE] AMS 5542, 5861, 5732	[Aerospace] Exhaust systems, afterburners, rocket-motor cases [Chemical] Reactors, piping systems, heat exchangers [Power] Steam-turbine components, boiler tubes
Haynes 230	[UNS] N06230 [ASTM] B572, B619, B622, B626, B564 [AMS] AMS 5878, AMS 5891 [ASME] SB572, SB622, SB619, SB626, SB564	[Aerospace] Fuel cans, transition ducts, flame holders, thermocouple covers [Chemical] Thermocouple protection tubes, heat exchangers, ducts, high-temperature bellows
Haynes 242	[UNS] N10242 [ASTM] B434, B573, B572, B622, B619, B626, B564 [ASME] SB434, SB573, SB622, SB619, SB626, SB564	[Aerospace] Seals, duct segments, casings, fasteners, rocket nozzles, pumps
Hy-Mu 80	[UNS] N14080 [ASTM] A753, A596	[Electronics] Magnetic sensors, current sensors
Nimonic 100	[UNS] N13100	[Aerospace] Turbine blades, disks, rings, shafts, fasteners [Chemical & Petrochemical] Chemical reactors, petroleum-refining equipment, chemical sensors [Nuclear] Fuel tubes
Nimonic 105	[UNS] N13021	[Aerospace] Turbine blades, disks, rings, shafts, fasteners [Chemical & Petrochemical] Chemical reactors, petroleum-refining equipment, chemical sensors [Nuclear] Fuel tubes
Nimonic 115	UNS N07115	[Aerospace] Turbine blades, exhaust nozzles, jet engines, turbochargers [Petrochemical] Pumps, valves [Power] Steam-turbine rotors, heat exchangers, gas turbines
Nimonic 75	[UNS] N06075	[Aerospace] Turbine blades, aerospace fasteners [Chemical] Heat exchangers, reactors [Automotive] Exhaust valves, turbochargers [Petrochemical] Valves, fittings
Nimonic 80A	[UNS] N07080 [ASTM] B637	[Aerospace] Turbine blades, disks, rings, aerospace bolts [Marine] Exhaust pipes [Automotive] Exhaust valves [Nuclear] Boiler-tube supports
Nimonic 90	[UNS] N07090 [SAE] AMS 5829	[Aerospace] Turbine blades, disks, rings [Nuclear] Fuel tubes [Petrochemical] Chemical reactors, petroleum-refining equipment, chemical sensors
Nimonic C263	[UNS] N07263 [SAE] AMS 5872, AMS 5886	[Aerospace] Turbine blades, exhaust nozzles, jet engines, turbochargers [Petrochemical] Pumps, valves [Power] Steam-turbine rotors, heat exchangers, gas turbines
PWA 1426	N/A	[Aerospace] Turbine blades, turbine-engine fans, airfoils
PWA 1480	N/A	[Aerospace] Turbine blades, turbine-engine fans, airfoils
PWA 1484	N/A	[Aerospace] Turbine blades, turbine-engine fans, airfoils
PWA 1487	N/A	[Aerospace] Turbine blades, turbine-engine fans, airfoils

Grade	Common Name / Series	Principal Applications
Rene 41	UNS N07041 [SAE] AMS 5545, AMS 5712, AMS 5713, AMS 5800	[Aerospace] Turbine blades, turbine wheels, combustion-chamber liners, springs, fasteners, turbine casings
Rene 77	[UNS] N07777	[Aerospace] Turbine blades, turbine wheels, combustion-chamber liners, springs, fasteners, turbine casings
Rene 80	N/A	[Aerospace] Turbine blades, turbine wheels, combustion-chamber liners, springs, fasteners, turbine casings
Rene 125	[UNS] N12125	[Aerospace] Turbine blades, turbine wheels, combustion-chamber liners, springs, fasteners, turbine casings
Rene 142	[UNS] N07042	[Aerospace] Turbine blades, turbine wheels, combustion-chamber liners, springs, fasteners, turbine casings
Rene 220	[UNS] N07220	[Aerospace] Turbine blades, turbine wheels, combustion-chamber liners, springs, fasteners, turbine casings
Rene N4	N/A	[Aerospace] Gas-turbine blades, airfoils
Rene N5	N/A	[Aerospace] Gas-turbine blades, airfoils
Rene N6	N/A	[Aerospace] Gas-turbine blades, airfoils
Udimet 500	[UNS] N07500 [ASTM] B637 [SAE] AMS 5751, AMS 5753, AMS 5384	[Aerospace] Aircraft blades, gas-turbine blades, combustion-chamber liners [Chemical] Pressure vessels, heat exchangers
Udimet 520	[ASTM] B637	[Aerospace] Aircraft blades, gas-turbine blades, turbine wheels, combustion-chamber liners [Chemical] Pressure vessels, heat exchangers
Udimet 700	[UNS] N07700 [SAE] AMS 5662, AMS 5663	[Aerospace] Gas-turbine blades, combustion-chamber liners [Chemical] Heat exchangers, pressure vessels
Udimet 710	[ASTM] B637	[Aerospace] Aircraft, gas turbines, turbine blades [Chemical] Heat exchangers
Waspaloy	[UNS] N07001 [ASTM] B637 [SAE] AMS 5544, AMS 5704, AMS 5706-5708, AMS 5828	[Aerospace] Aircraft engines, heat-exchanger components, gas turbines, aircraft wings, combustion tubes, turbine disks, rotor disks, shafts, spacers, seals, rings, cases
Monel 400*	[UNS] N04400 [ASTM] B164, B564, B127, B165, B725, B163, B730, B751, B829, B775 [SAE] AMS 4730, AMS 4731, AMS 4544, AMS 4574 [ASME] SB164, SB564, SB127, SB163, SB165, SB725, SB730, SB751, SB775, SB829	[Marine] Feedwater and steam-generator tubes, brine heaters, seawater scrubbers, seawater valves, pump shafts, fishing wire, freshwater tanks [Refining] Crude-oil transfer pipes [Chemical] Heat exchangers, boiler feeders
Monel K-500	[UNS] N05500 [ASTM] B865 [SAE] AMS 4676	[Marine] Fasteners, springs [Chemical] Pumps, valve components

Grade	Common Name / Series	Principal Applications
Maraging 250	[UNS] K92890 [SAE] AMS 6512, AMS 6520, AMS 6501	[Aerospace] Missiles, rocket-motor cases, aircraft landing gear, pressure vessels, fasteners, shafts
Maraging 350	[UNS] K93160 [SAE] AMS 6512, AMS 6514, AMS 6515	[Aerospace] Missiles, rocket-motor cases, aircraft landing gear, pressure vessels, fasteners, shafts
Mar-M247	N/A	[Aerospace] Combustors, turbine-engine components, turbine blades, vanes, rotors, disks, turbocharger wheels, turbopump turbine nozzles, turbopump impellers
GTD 111	N/A	[Aerospace] Gas-turbine blades, aircraft engines, gas-turbine nozzles, vanes, turbine buckets
GTD 222	N/A	[Aerospace] Aircraft engines, turbine-engine components, gas-turbine nozzles, gas-turbine blades, vanes
CMSX-2	N/A	[Aerospace] Gas-turbine blades, airfoils
CMSX-3	N/A	[Aerospace] Gas-turbine blades, airfoils
CMSX-4	N/A	[Aerospace] Gas-turbine blades, airfoils
F-75	[UNS] R30075 [ASTM] F75	[Medical] Implants (dental, orthopedic) [Aerospace] Aircraft, gas-turbine blades, fuel nozzles, vanes
FSX 414	[ASTM] A567 [SAE] AMS 5382, AMS 5537, AMS 5759, AMS 5789	[Aerospace] Gas-turbine nozzles, turbine blades, high-pressure compressor disks, turbine disks, aircraft jet engines, vanes, engine nozzles
FSX 430	N/A	[Aerospace] Gas-turbine blades, vanes
HS 6	[UNS] R30006, R30106, W73006, W73036 [SAE] AMS 5788, AMS 5387	[Aerospace] Turbine blades, steam-turbine bearings [Chemical] Pumps, chemical-processing equipment accessories [Petroleum] Drill bits, drilling equipment, pumps [Automotive] Engine components, turbochargers [Medical] Hip-joint prostheses, dental prosthetics
HS 6B	[UNS] R30016 [SAE] AMS 5894	[Aerospace] High-temperature bearings, fan blades, steam turbines [Petroleum] Needle valves, pump plungers, steam-erosion shields
HS 21	[UNS] R30021, W73041, W73021 [SAE] AMS 5819, AMS 5385	[Medical] Implants (orthopedic, dental), surgical equipment [Aerospace] Jet-engine combustion/exhaust-system components, turbine blades, vanes, molds and dies
HS 25 (L605)	[UNS] R30605 [ASTM] F90 [SAE] AMS 5759, AMS 5537, AMS 5796	[Aerospace] Turbine blades, afterburner components, turbine rings [Medical] Implants
HS 31 (X40)	[UNS] R30031 [ASTM] A732 [SAE] AMS 5382	[Aerospace] Gas-turbine blades, vanes, gas turbines, turbochargers, bearings [Medical] Prosthetics (orthopedic, dental)
HS 188	[UNS] R30188 [SAE] AMS 5608, AMS 5772, AMS 5801	[Aerospace] Combustors, flame holders, liners, transition ducts
X-45	[ASTM] A567	[Aerospace] Aerojet engines, turbochargers, turbine

Grade	Common Name / Series	Principal Applications
		blades, guide vanes, bearings, housings [Medical] Medical devices
ECY 768	N/A	[Aerospace] Gas-turbine blades, vanes

2.7 Stainless

Grade	Common Name / Series	Principal Applications
13-8Mo	[UNS] S13800 [ASTM] A564, A693, A705 [SAE] AMS 5629, AMS 5864 [ASME] SA564, SA693, SA705	[Aerospace] Landing gear, fittings, hydraulic assemblies, fasteners, valves [Oil & Gas] Packers, downhole tools, valves [Chemical] Pumps, valves, pressure vessels, heat exchangers [Automotive] Valves, fasteners, fittings, shafts [Marine] Shafts, desalination equipment
15-5PH	[UNS] S15500 [ASTM] A564, A705 [SAE] AMS 5659, AMS 5862, AMS 5826	[Aerospace] Engine components, structural components, landing gear [Power] Gas-turbine engine components, valves, shafts
17-4PH	[UNS] S17400 [ASTM] A693, A564 [SAE] AMS 5622, AMS 5642, AMS 5643, AMS 5604 [ASME] SA693, SA484, SA564	[Marine] Foils, shafts, impellers [Aerospace] Turbine blades, pressure vessels, aircraft, engine components [Chemical] Storage tanks, pipelines, reactors [Oil & Gas] Wellhead valves [Medical] Artificial joints, surgical instruments
2205 Duplex	[UNS] S32205 [ASTM] A276, A240, A790, A928, A270, A789, A815 [ASME] SA276, SA479, SA240, SA790, SA789, SA815	[Marine] Deep-sea subsea structures, pipelines, seawater desalination facilities [Chemical] Pressure vessels, high-pressure storage tanks, high-pressure pipelines [Oil & Gas] Oilfield piping
2507 Duplex	[UNS] S32750 [ASTM] A276, A240, A790, A789, A182 [ASME] SA240, SA276, SA479, SA182	[Chemical] Chemical-process pressure vessels, piping, heat exchangers [Marine] Desalination equipment, deep-sea subsea structures, pipelines [Oil & Gas] Oilfield piping [Power] Nuclear-power-plant water-treatment equipment, seawater desalination equipment
304	[UNS] S30400 [ASTM] A276, 276M, A240, A240M [SAE] AMS 5501, AMS 5513, AMS 5639, AMS 5560, AMS 5565-5567, AMS 5697 [ASME] SA182, SA194, SA213, SA240, SA249, SA312	[Medical] Surgical instruments, implants [Construction] Exterior-wall cladding, railings, door handles [Chemical] Storage tanks, pipelines [Automotive] Exhaust components [Food] Cookware, cooking utensils, food-processing equipment
304L	[UNS] S30403 [ASTM] A276, A182, A213, A240, A249, A269, A270, A312, A314 [SAE] AMS 5639, AMS 5647, AMS 5501, AMS 5511, AMS 5513, AMS 5560, AMS 5565-5567, AMS 5569, AMS 5575	[Medical] Surgical instruments, implants [Construction] Exterior-wall cladding, railings, door handles [Chemical] Storage tanks, pipelines [Automotive] Exhaust components [Food] Cookware, cooking utensils, food-processing equipment
309	[UNS] S30900 [ASTM] A240, A276, A312, A479 [SAE] AMS 5523 [ASME] SA240, SA479, SA312	[Chemical] Incinerators, rotary kilns, calcining furnaces, heat exchangers [Petroleum] Catalyst-recovery filters [Power] Pulverized-coal burners [Aerospace] Aircraft and jet-engine components [Automotive] Boiler baffles, automotive exhaust components
309S	[UNS] S30908 [ASTM] A240, A276, A479	[Chemical] Incinerators, rotary kilns, calcining furnaces, heat exchangers [Petroleum] Catalyst-recovery filters [Power] Tube hangers for petroleum-refining and steam boilers, pulverized-coal burners [Aerospace] Aircraft and jet-engine components [Automotive] Boiler baffles, automotive exhaust components
310	[UNS] S31000 [ASTM] A167, A480 [SAE]	[Chemical] Heat exchangers, heat-treatment equipment

Grade	Common Name / Series	Principal Applications
	AMS 5521 [ASME] SA240	[Petroleum] Tube hangers for petroleum-refining and steam boilers, coal-gasifier internals, catalyst-recovery equipment, regenerators, catalytic converters [Power] Coal-gasifier internals, pulverized-coal burners
310S	[UNS] S31008 [ASTM] A240, A480, A276, A479 [SAE] AMS 5521 [ASME] SA240	[Chemical] Heat exchangers, heat-treatment equipment [Petroleum] Tube hangers for petroleum-refining and steam boilers, coal-gasifier internals, catalyst-recovery systems, regenerators, catalytic converters [Power] Coal-gasifier internals, pulverized-coal burners
316	[UNS] S31600 [ASTM] A240, A666 [SAE] AMS 5524 [ASME] SA240	[Chemical] Heat exchangers, pressure vessels, chemical vessels, valves and pumps [Marine] Ship components, offshore structures [Medical] Surgical instruments, implants
316L	[UNS] S31603 [ASTM] A240, A666 [SAE] AMS 5507 [ASME] SA240	[Chemical] Heat exchangers, pressure vessels, chemical vessels, valves and pumps [Marine] Ship components, offshore structures [Medical] Surgical instruments, implants
317	[UNS] S31700 [ASTM] A276, A479, A240, A182, A580, A312, A358, A269, A249, A213	[Petrochemical] Chemical and petrochemical processing equipment, valve cages, safety barriers, piping
330	[UNS] N08330 [ASTM] B511, B512, B536, B535, B546, B710, B739 [SAE] AMS 5716, AMS 5592, J405, J412 [ASME] SB511, SB512, SB535, SB536, SB710, SB739	[Petrochemical] Heat exchangers, furnace components [Heat Treatment] Heat-treatment furnace vessels, high-temperature fans [Power] Boiler equipment, gas-turbine components
904L	[UNS] S08904, N08904 [ASTM] A240, A213, A269, A312, B625 [ASME] SA240, SB625	[Chemical] Piping, heat exchangers [Oil & Gas] Offshore process equipment [Marine] Condensers, piping [Air] Scrubbers for coal-fired power [Power] Desulfurization equipment, absorption towers, internals
Al 6XN	[UNS] N08367 [ASTM] A479, B691, A240, AB688, A312, A249, B675, B676, A182, B462 [ASME] SB691, SA240, SB688, SA358, SA409, SB675, SA813, SA814, SA312, SA249, SA688, SB676, SB690, SB462, SB366, SB564, SB804	[Chemical] Chemical-process tanks, pipelines [Marine] Seawater heat exchangers, seawater desalination equipment, pumps [Petroleum] Offshore oil and gas production equipment [Pulp] Pulp-bleaching plant washers, press rolls, pipelines
A 286	[UNS] S62286 [ASTM] A638 [SAE] AMS 5726, AMS 5731, AMS 5734-5737, AMS 5838, AMS 5895, AMS 5525, AMS 5858	[Aerospace] Jet-engine components, fasteners, springs [Automotive] High-temperature afterburner components, tanks, piping, pumps, heat exchangers, turbochargers
254SMO	[UNS] S31254 [ASTM] A276, A479, A249, A269, A312, A358, A409, A182, A473 [ASME] S31254, SA182, SA276, SA479, SA240, SA312	[Marine] Seawater cooling units, cooling-water pipes, fire-protection systems, seawater-treatment equipment [Chemical] Tanks, pipelines, heat exchangers
Alnico 1	N/A	[Electronics] Magnetic switches, magnetic sensors, relays, temperature and pressure controllers, magnetic separators, lifting magnets [Electrical] Electric motors,

Grade	Common Name / Series	Principal Applications
		microphones, generators, speakers [Automotive] Lighters, odometers
Alnico 2	N/A	[Electronics] Magnetic switches, magnetic sensors, relays, temperature and pressure controllers, magnetic separators, lifting magnets
Alnico 3	N/A	[Electronics] Magnetic switches, magnetic sensors, relays, temperature and pressure controllers, magnetic separators, lifting magnets [Electrical] Electric motors, microphones, generators, speakers [Automotive] Lighters, odometers
Alnico 4	N/A	[Electronics] Magnetic switches, magnetic sensors, relays, temperature and pressure controllers, magnetic separators, lifting magnets [Electrical] Electric motors, microphones, generators, speakers [Automotive] Lighters, odometers
Alnico 5	N/A	[Electronics] Magnetic switches, magnetic sensors, relays, temperature and pressure controllers, magnetic separators, lifting magnets [Electrical] Electric motors, microphones, generators, speakers [Automotive] Lighters, odometers
Invar 36	[UNS] K93600, K93603 [ASTM] F1684, B753, B603, B388	[Medical] Thermostats, measuring equipment, laser components, MRI [Electrical] Power supplies [Electronics] Satellite and missile electronic-control frames, semiconductor lead frames, microwave materials, MLCC substrate material [Chemical] Storage vessels, piping, bimetal, bimetallic thermostats [Optics] Mirrors, lenses [Nuclear Weapons] Fuel cladding, control-rod drive mechanisms
Invar 42	[UNS] K94100 [ASTM] F30, F1684, A162, B127, B582, B575, B168, B443, B463, B626, B536, F29	[Electronics] Electron tubes, transformer and capacitor bushings, semiconductor lead frames, CRT electron guns, microelectronics, thermostat rods, electronic covering, HVT lines [Aerospace] Tooling for aerospace composites [Electrical] Bimetallic thermostats, electrical transformers, precision condenser units
Kovar	[UNS] K94610 [ASTM] F15 [SAE] AMS 7726, AMS 7728, AMS 7727	[Electrical] Igniters, magnetrons, transistors, relays, integrated circuits, cathode-ray tubes, vacuum tubes [Electronics] Semiconductor components, electronic-product sealing, bonding materials, high-energy emission tubes, transistor leads, IC lead frames, photographic flash valves
Na22H	N/A	[Chemical] Furnace components, sintering and calcining muffles, calciner components, radiant tubes, pyrolysis coils [Electrical] Roller hearths, furnace beam supports
Super Na22H	N/A	[Chemical] Furnace components, sintering and calcining muffles, calciner components, radiant tubes, pyrolysis coils [Electrical] Roller hearths, furnace beam supports

Grade	Common Name / Series	Principal Applications
MO-RE 1	N/A	[Aerospace] Space-reactor core heating tubes [Chemical] High-temperature furnace heaters, high-temperature thermocouples
MO-RE 2	N/A	[Aerospace] Space-reactor core heating tubes [Chemical] High-temperature furnace heaters, high-temperature thermocouples
Nichrome (80-20)	[UNS] N06003 [ASTM] B344 [SAE] AMS 5676	[Electrical] Resistance wire, toasters, electric kettles, heaters, ovens, irons [Medical] Dental prosthetics
Ni-Resist 1	[UNS] F41000 [ASTM] A436, A439, A439M	[Marine] Pumps, valves, diesel-engine manifolds, bolts, nuts [Chemical] Blowers, compressors, condenser components, cryogenic equipment, furnace components, piping, pots and kettles, pump casings and impellers [Electrical] Mechanical seals, meter components, non-magnetic housings, pole-line hardware, pump cases, resistance grids, turbine components [Petroleum] Water-flood pumps, gas compressors, petroleum-fluid pumps [Pulp] Dryer rolls, grids, Fourdrinier castings
Ni-Resist 2	[UNS] F41002 [ASTM] A436, A439, A439M	[Marine] Pumps, valves, diesel-engine manifolds, bolts, nuts [Chemical] Blowers, compressors, condenser components, cryogenic equipment, furnace components, piping, pots and kettles, pump casings and impellers [Electrical] Mechanical seals, meter components, non-magnetic housings, pole-line hardware, pump cases, resistance grids, turbine components [Petroleum] Water-flood pumps, gas compressors, petroleum-fluid pumps [Pulp] Dryer rolls, grids, Fourdrinier castings
Ni-Resist 3	[UNS] F41004 [ASTM] A436, A439, A439M	[Marine] Pumps, valves, diesel-engine manifolds, bolts, nuts [Chemical] Blowers, compressors, condenser components, cryogenic equipment, furnace components, piping, pots and kettles, pump casings and impellers [Electrical] Mechanical seals, meter components, non-magnetic housings, pole-line hardware, pump cases, resistance grids, turbine components [Petroleum] Water-flood pumps, gas compressors, petroleum-fluid pumps [Pulp] Dryer rolls, grids, Fourdrinier castings
Ni-Resist 4	[UNS] F41005 [ASTM] A436, A439, A439M	[Marine] Pumps, valves, diesel-engine manifolds, bolts, nuts [Chemical] Blowers, compressors, condenser components, cryogenic equipment, furnace components, piping, pots and kettles, pump casings and impellers [Electrical] Mechanical seals, meter components, non-magnetic housings, pole-line hardware, pump cases, resistance grids, turbine components [Petroleum] Water-flood pumps, gas compressors, petroleum-fluid pumps [Pulp] Dryer rolls,

Grade	Common Name / Series	Principal Applications
		grids, Fourdrinier castings
Ni-Resist 5	[UNS] F41006	[Marine] Pumps, valves, diesel-engine manifolds, bolts, nuts [Chemical] Blowers, compressors, condenser components, cryogenic equipment, furnace components, piping, pots and kettles, pump casings and impellers [Electrical] Mechanical seals, meter components, non-magnetic housings, pole-line hardware, pump cases, resistance grids, turbine components [Petroleum] Water-flood pumps, gas compressors, petroleum-fluid pumps [Pulp] Dryer rolls, grids, Fourdrinier castings
Supertherm	N/A	[Petrochemical] Heat-treatment furnaces, cement kilns, furnace tubes, refinery-furnace tubes
N-155	[UNS] R30155 [SAE] AMS 5769, AMS 5768, AMS 5794, AMS 5795, AMS 5532	[Aerospace] Tail cones and tail pipes, exhaust manifolds, combustion chambers, afterburners, turbine blades, bolts
35Ni25CrNb	[ASTM] A297	[Petrochemical] Pyrolysis coils, reformer tubes, furnace tubes, cracking-furnace tubes
45Ni35CrNb	N/A	[Petrochemical] Pyrolysis coils, reformer tubes, furnace tubes, cracking-furnace tubes
50Ni50CrNb	[UNS] R20501 [ASTM] SA560 [ASME] SA560	[Petrochemical] Petrochemical pipe supports, hangers, furnace components, superheater and reheater piping

2.8 Titanium Alloys

Grade	Common Name / Series	Principal Applications
Ti CP Gr.1	[UNS] R50250 [ASTM] B265, B348, F67 [SAE] AMS 4940 [ASME] SB265, SB337, SB348	[Aerospace] Aircraft components, rocket engines, spacecraft bodies, landing-gear components, engine casings, propellers [Chemical] Heat exchangers, pipelines [Marine] Desalination units, piping, ship components [Power] Condensers [Medical] Surgical implants, prosthetics, artificial joints, needles, eyeglass frames, suture clips
Ti CP Gr.2	[UNS] R50400 [ASTM] B348, B265, F67, F1341, B381, B367 [SAE] AMS 4902 [ASME] SB265, SB348	[Medical] Medical needles, dental and orthopedic instruments, eyeglass frames, suture equipment, implants (dental and orthopedic) [Chemical] Heat exchangers, pipelines, reactors [Aerospace] Aircraft components, rocket engines, spacecraft bodies, bellows, airframe structures, gaskets
Ti CP Gr.2H	[UNS] R50400 [ASTM] B348, B265, B338	[Marine] Seawater piping, valve components [Chemical] Heat-exchanger tubes, chemical tanks
Ti CP Gr.3	[UNS] R50550 [ASTM] B348, B265, B338, F67, F467, F468 [SAE] AMS 4900 [ASME] SB265, SB348	[Aerospace] Aircraft components, rocket engines, spacecraft bodies, bellows, airframe structures, gaskets [Medical] Surgical instruments, implants [Gas] Reactors, pressure vessels, piping, heat exchangers, liners [Chemical] Heat exchangers, pipelines
Ti CP Gr.4	[UNS] R50700 [ASTM] B348, B265, F67, F1341, B381, B367 [SAE] AMS 4921, AMS 4901 [ASME] SB265, SB348	[Medical] Medical needles, dental and orthopedic instruments, eyeglass frames, suture equipment, implants (dental and orthopedic) [Chemical] Heat exchangers, pipelines, reactors [Aerospace] Aircraft components, rocket engines, spacecraft bodies, bellows, airframe structures, gaskets
Ti Gr.5 (6Al4V)*	[UNS] R56400 [ASTM] B265, B348, B381, B861, B862, B338 [SAE] AMS 4928, AMS 4920, AMS 4911, AMS 4906, AMS 4905, AMS 4954, AMS 4935, AMS 4934, AMS 4930, AMS 4967, AMS 5540 [ASME] SB265, SB348, SB381, SB861, SB862, SB338	[Aerospace] Gas-turbine blades, disks, rings, fasteners, cases, hubs, aero-engine fans [Chemical] Cryogenic vessels, storage tanks
Ti Gr.6	[UNS] R54520 [ASTM] B265, B348, B381 [ASME] SB265, SB348, SB381	[Aerospace] Aircraft-engine high-temperature structural components, compressor cases, ring structural members, high-temperature forgings [Marine] Low-temperature-toughness structural components, welded structures
Ti Gr.7 (Pd)	[UNS] R52400 [ASTM] B265, B348, B381, B861, B862, B338 [ASME] SB265, SB348, SB381, SB861, SB862, SB338	[Chemical] Heat exchangers, pipelines, cryogenic vessels, storage tanks, bolts, fasteners
Ti Gr.9	[UNS] R56320 [ASTM] B348, B338	[Aerospace] Aircraft hydraulic tubing
Ti Gr.11 (Pd)	[UNS] R52250 [ASTM] B265, B348, B381, B861, B862, B338 [ASME] SB265,	[Chemical] Heat exchangers, cryogenic vessels, ducts, pumps, valves, fittings [Medical] Implants [Oil & Gas]

Grade	Common Name / Series	Principal Applications
	SB348, SB381, SB861, SB862, SB338	Pipelines
Ti Gr.12 (Ni)	[UNS] R53400 [ASTM] B265, B337, B338, B348, B381, B861, B862, B363 [ASME] SB265, SB338, SB861, SB862, SB348, SB363	[Power] Nuclear power plants, evaporators [Chemical] Pressure vessels, pumps, valves, heat exchangers, pipes, fittings [Marine] Ship components, pumps, valves [Aerospace] Aircraft components, rocket engines, gaskets
Ti Gr.13	[UNS] R53413 [ASTM] B265, B348	[Chemical] Chemical tanks, heat-exchanger components, seawater piping
Ti Gr.14	[UNS] R53414 [ASTM] B265, B348	[Marine] Seawater piping [Chemical] Chemical-plant equipment, heat-exchanger components
Ti Gr.15	[UNS] R53415 [ASTM] B265, B348	[Chemical] Acid tanks, chemical-plant heat-exchanger tubes, corrosive-service piping
Ti Gr.16 (Pd)	[UNS] R52402 [ASTM] B265, B348, B367, B381 [ASME] SB265	[Chemical] Pressure vessels, pumps, valves, heat exchangers, pipes, fittings
Ti Gr.17	[UNS] R52252 [ASTM] B265, B348 [ASME] SB265, SB348	[Chemical] Seawater heat exchangers, chloride-environment piping, reactor linings, high-corrosion-resistance long-service equipment, chemical-plant devices
Ti Gr.18	[UNS] R56322 [ASTM] B338, B265	[Aerospace] Aircraft hydraulic tubing, aircraft tubing
Ti Gr.19 (Beta-C)	[UNS] R58640 [ASTM] B348, B363, B265 [SAE] AMS 4981, AMS 4956, AMS 4957, AMS 4958, AMS 4976 [ASME] SB348, SB265	[Aerospace] Springs, fasteners, aircraft landing gear [Oil & Gas] Oil and gas tubing [Automotive] Fasteners, springs
Ti Gr.20	UNS R58645	[Chemical] Highly corrosive reactors, acid/chloride tanks, high-corrosion-resistance piping systems, process equipment for corrosive environments, storage vessels
Ti Gr.21	[UNS] R58210 [ASTM] B348, B381	[Aerospace] Airframe structural frames, landing-gear components, high-load bolts and fasteners, aerospace structural forgings, high-strength connectors
Ti Gr.23 (ELI)*	[UNS] R56401 [ASTM] B265, B348, B381, B338, B861, B862, B863 [SAE] AMS 2631, AMS 4930, AMS 6932, AMS 4907, AMS 4931, AMS 4956 [ASME] SB265, SB348, SB381, SB338, SB861, SB862, SB863	[Medical] Orthopedic pins and screws, orthopedic cables, orthotic devices, medical devices, artificial joints, implants
Ti Gr.24	[UNS] R56405	[Aerospace] Structural brackets, high-strength fastening components, landing-gear secondary structural members, high-strength lightweight frame components, test structural members
Ti Gr.25	[UNS] R56403	[Aerospace] High-strength bolts/nuts, fasteners, structural joints, high-stress machine components, frame-joining structural members

Grade	Common Name / Series	Principal Applications
Ti Gr.26	[UNS] R52404	[Aerospace] Landing-gear structural components, high-load frames, support structural members, high-strength forged structural members, power-transmission components
Ti Gr.27	[UNS] R52254	[Aerospace] Fatigue-load structural members, airframe frame reinforcements, brackets, high-stress machine structural components, durability components
Ti Gr.28	[UNS] R56323	[Aerospace] Lightweight structural frames, internal structural reinforcements, fittings, high-strength lightweight structural components, test materials
Ti Gr.29	[UNS] R56404	[Aerospace] Aircraft structural bolts/fasteners, fastening-system components, high-strength fastening components, corrosion-resistant high-stress structural members
Ti Gr.30	[UNS] R53530	[Aerospace] Structural frames, landing-gear secondary structural members, high-fatigue machine structural components, high-strength test materials
Ti Gr.31	[UNS] R53532	[Aerospace] High-load structural brackets, frame-connection components, high-stress forged structural members, durability machine components
Ti Gr.32	[UNS] R55111	[Aerospace] Lightweight structural components, airframe internal frames, high-strength lightweight structural members, machine-frame components
Ti Gr.33	[UNS] R53442	[Aerospace] Fatigue-resistant structural members, airframe reinforcements, high-stress structural components, durability test materials
Ti Gr.34	[UNS] R53445	[Aerospace] Structural frames, airframe brackets, high-strength structural components, mechanical load-bearing members
Ti Gr.35	[UNS] R56340	[Aerospace] High-strength structural frames, landing-gear secondary components, high-stress structural members, test components
Ti Gr.36	[UNS] R58450	[Aerospace] Beta-Ti structural components, high-load frames, high-strength machine structural members, durability components
Ti Gr.37	[UNS] R52815	[Aerospace] Fatigue-load structural components, brackets, high-strength structural members, test materials
Ti Gr.38	[UNS] R54250	[Aerospace] Landing-gear structural members, high-load frames, high-strength forgings, machine structural members
Ti Gr.39	[UNS] R53390	[Aerospace] Lightweight high-strength structural frames, internal structural members, high-stress structural components, test materials

Grade	Common Name / Series	Principal Applications
Ti Gr.40	N/A	[Aerospace] Structural frames, high-load brackets, high-strength machine structural members, test and development materials
Ti-6Al-7Nb	[UNS] R56700 [ASTM] F1295	[Medical] Human implants (hip joint, knee joint), dental implants, orthopedic fixation devices, surgical precision structural components, in-body insertion devices
Ti-10V-2Fe-3Al	[UNS] R56410 [SAE] AMS 4983, AMS 4984, AMS 4986, AMS 4987	[Aerospace] Landing-gear structural components, high-load frames, forged structural members, high-strength bolts, load-bearing structural components
Ti 6-2-4-2	[UNS] R54620 [SAE] AMS 4919, AMS 4975, AMS 4976	[Aerospace] Airframes, gas-turbine engines, afterburner cans, hot-air-blower components, engine components, disks, impellers, turbines, jet-engine compressors
Ti-5Al-2Sn-4Zr-4Mo-4Cr (Ti-17)	[UNS] R58650 [SAE] AMS 4995	[Aerospace] Engine disks, shafts, compressor rotor structural components, high-stress rotating structural members, high-strength forgings
Ti-6Al-2Sn-4Zr-6Mo (6246)	[UNS] R56260 [SAE] AMS 4981	[Aerospace] High-temperature turbine disks, engine rotating structural members, high-temperature creep-resistant structural components, long-duration high-temperature rotating bodies
Ti 6-2-2-2-2	[UNS] R56222	[Aerospace] Aircraft components [Marine] Hulls, offshore structures, seawater valves [Medical] Implants (orthopedic and dental)
Ti-8-1-1	[UNS] R54810 [SAE] AMS 4915, AMS 4916, AMS 4933, AMS 4955, AMS 4973	[Aerospace] Brackets, fittings, compressor cases, disks, aircraft engines, compressor blades [Chemical] Reactors, tanks, piping [Medical] Implants, surgical instruments
Ti-5.8Al-4Sn-3.5Zr-0.7Nb-0.5Mo-0.35Si-0.06C (834)	N/A	[Aerospace] High-temperature compressor disks, engine rotor structural members, high-creep-resistance rotating bodies, high-temperature structural forgings
Ti-6Al-2.7Sn-4Zr-0.4Mo-0.45Si (1100)	N/A	[Aerospace] High-temperature turbine blades, disks, engine high-temperature structural components, thermal-fatigue-resistant rotating components, high-temperature load-bearing structural members
Ti-15Mo	[UNS] R58150 [ASTM] F2066	[Medical] Implants, orthodontic appliances, artificial joints
Ti 15-3-3-3	[UNS] R58153 [SAE] AMS 4914	[Aerospace] Fasteners, tank components, tubes, landing gear, rotor blades [Chemical] Pressure vessels, pipes [Sports] Golf clubs, bicycle frames [Automotive] Suspension springs, exhaust components [Medical] Eyeglass frames
Ti-15Zr	N/A	[Medical] Implants

3. Data Collection

3.1 Sources

SMP collects price data and market information from a worldwide network of market participants. Sources include, but are not limited to, the following:

1. **Producers and melters/smelters:** Primary and secondary producers of nickel alloys, cobalt alloys, titanium alloys, stainless steel, and rare earths.
2. **Traders and distributors:** Independent traders, stockholders, and service centers handling specialty metals.
3. **Recyclers and scrap processors:** Companies involved in the collection, processing, and trading of specialty-metals scrap.
4. **End users and buyers:** Aerospace, medical-device, energy, chemical-processing, and other downstream manufacturers.
5. **Industry associations and exchanges:** Public exchange prices (e.g., LME nickel, LME cobalt) are used as reference benchmarks and are incorporated into the basis of SMP's specialty-alloy price assessments.

3.2 Collection Methods

1. Direct communication with market participants (telephone, email, messaging).
2. Monitoring of published offer prices, bid outcomes, and contract negotiations.
3. Review of exchange settlement prices and published surcharge tables.
4. Cross-checking against public trade data, customs statistics, and industry reports.
5. Attendance at industry events, conferences, and trade shows (e.g., BIR, ITA, ReMA).

3.3 Confidentiality

SMP treats all price submissions and market information received from individual sources as strictly confidential. No published report discloses individual company names, transaction details, or source identities. All data is aggregated and anonymized before publication.

4. Price Assessment Procedure

4.1 Assessment Basis

SMP's price assessments aim to reflect the prevailing market value of each covered metal or alloy grade at the time of assessment. An assessed price represents the price at which a transaction could reasonably be expected to be concluded between a willing buyer and a willing seller under normal market conditions.

4.2 Price Types

Price Type	Definition
Spot / Market Price	The price applicable to immediate or short-term delivery (generally within 30 days) based on current market conditions.
Indicative Offer Price	An offer price published or communicated by a producer, trader, or distributor, which does not necessarily represent a completed transaction.
Transaction Price	A price confirmed as a completed transaction between a buyer and a seller.
Reference / Derived Price	A price derived or calculated from raw-material costs, exchange prices, and alloy surcharges when direct transaction data is limited.

4.3 Delivery and Pricing Basis

Unless otherwise stated in an individual price report, the following default pricing bases apply:

Term	Definition
Ex-works	Price at the production site or warehouse, excluding freight and insurance.
CIF	Price including freight and insurance to the buyer's designated port.
FOB	Price for delivery on board at the seller's designated port.
Delivered	Price including freight to the buyer's facility.
In-warehouse	Price for material available for immediate supply from stock at a distributor or service-center location.

4.4 Currency and Units

1. Unless otherwise stated, all prices are published in U.S. dollars (USD).
2. The unit of measure may vary by metal group and is specified in each report; the standard unit is price per kilogram (\$/kg).
3. Prices collected in other currencies are converted using the prevailing interbank exchange rate at the time of assessment.

4.5 Reporting Period and Frequency

1. Weekly reports: Published every week, covering the Monday-to-Friday assessment period shown in each report header (e.g., "April 13, 2026 – April 17, 2026").
2. Price-trend charts and moving averages can be viewed optionally within the system and are presented as 7-week, 30-week, and 90-week moving averages.
3. Where a significant market event requires an immediate price reassessment, an additional interim report may be published.

5. Data Validation and Quality Control

5.1 Validation Steps

Every data point passes through the following validation procedure before being included in a published price assessment:

Step 1 — Source Verification: Confirm that the source of the data is a genuine market participant directly engaged in the production, trading, processing, or consumption of the relevant metal or alloy.

Step 2 — Data Consistency Check: Compare the submitted price against the previous week's assessment, the 30-week moving average, and data collected concurrently from other sources. Data points deviating by more than 10% from the moving average are flagged for further investigation.

Step 3 — Cross-Verification: Check the submitted price against relevant raw-material input costs (e.g., LME nickel, LME cobalt, ferrochrome, ferromolybdenum, titanium sponge) to confirm that the reported alloy price is consistent with the underlying cost structure.

Step 4 — Outlier Handling: Data points that cannot be validated through Steps 2 and 3 are excluded from the assessment. The reason for exclusion is documented internally.

Step 5 — Editorial Review: The final assessed price is reviewed by the editorial team before publication. This review confirms that the assessment range is internally consistent and supported by the available data.

5.2 Minimum Data Requirements

To publish a price assessment, SMP requires a minimum of two independent data points obtained from different market participants. Where this minimum requirement is not met for a given grade in a given week, SMP will take one of the following actions:

1. Publish the previous week's assessment with a note indicating that new data was insufficient; or
2. Suspend the price assessment for that grade until sufficient data is available.

5.3 Low-Liquidity Market Conditions

Some specialty-alloy grades trade rarely or in small volumes. Under low-liquidity market conditions, SMP may supplement direct transaction data with the following:

1. Indicative offer prices from producers and traders.
2. Cost-based reference-price calculations using raw-material input prices.
3. A wider assessment price range to reflect market uncertainty.

Where low-liquidity market conditions apply, this is stated in the relevant price report.

6. Price Report Structure

Each weekly price report follows a standardized structure to ensure consistency and usability.

Section	Content
Header	Metal group, alloy grade, reporting period (Monday–Friday dates).
Introduction	Brief alloy description, principal applications, main alloying elements.
Price Assessment	Assessed price range (low–high), midpoint, unit (\$/kg), delivery basis.
Price Trend Chart	Historical price chart including 7-week, 30-week, and 90-week moving averages.
Raw Material Impact	Analysis of key input-cost movements (e.g., Ni, Co, Cr, Mo, W, Ti sponge).
Market Direction	Directional signal: Bullish / Bearish / Stable / Volatile.
Market Commentary	Qualitative assessment of supply-demand trends, trade flows, inventory levels, and related news.
Buyer-Side Interpretation	Implications for procurement strategy and purchase timing.
Supplier-Side Interpretation	Implications for pricing strategy and production planning.
Related Reports	Links to related alloy grades and metal groups.

7. Moving Averages and Trend Calculations

SMP publishes moving averages alongside the raw price-assessment data so that users can identify the underlying trend and filter out short-term volatility.

7.1 Calculation Method

1. 7-week moving average: The simple arithmetic mean of the assessment midpoints from the 7 most recent weekly assessments.
2. 30-week moving average: The simple arithmetic mean of the assessment midpoints from the 30 most recent weekly assessments.
3. 90-week moving average: The simple arithmetic mean of the assessment midpoints from the 90 most recent weekly assessments.

These indicators are provided to Market Intelligence and Sourcing Pro subscribers; as an exception, they are made publicly available during Open Beta free-access periods.

7.2 Handling of Missing Data

Where a price assessment is not published in a given week (for reasons such as holidays or insufficient data), that week is carried at the previous week's assessed price, and the moving average is shown unchanged.

8. Regional Coverage

SMP's price assessments primarily reflect global market conditions for specialty metals that are traded internationally and that show limited price variation between regions. Where regional price differences exist, SMP states the applicable region in the relevant report header.

8.1 Principal Markets

1. North America (including the United States, Canada, and Mexico).
2. Europe (including the EU, the United Kingdom, and Türkiye).
3. Asia (including China, Japan, Korea, and Southeast Asia).

8.2 Regional Adjustments

Some grades may show significant regional price differences due to tariffs, logistics costs, or regional supply-demand imbalances. In such cases, SMP may publish a separate regional price assessment or note the regional context in the Market Commentary section.

9. Corrections and Revisions

9.1 Correction Policy

Where SMP identifies an error after a price assessment has been published, the following procedure applies:

Errors identified within 24 hours of publication: The original report is corrected directly. A correction notice describing the nature of the error and the corrected value is attached to the report.

Errors identified more than 24 hours after publication: A separate correction notice referencing the original report is published as a standalone update, and a link to that correction notice is added to the original report.

9.2 Revision Policy

Except to correct factual errors, SMP does not retroactively revise historical price assessments. A price assessment reflects market conditions at the time of assessment and is not adjusted in light of information obtained afterward.

10. Editorial Independence and Conflicts of Interest

SMP maintains strict editorial independence. The following policies apply:

1. SMP and its officers and employees do not trade the metals covered by SMP price reports.
2. Price assessments are not influenced by advertising revenue, subscription revenue, sponsorship agreements, or other commercial relationships.
3. SMP does not accept payment from any market participant in exchange for favorable price treatment or assessment outcomes.
4. Employees involved in price assessment must disclose potential conflicts of interest. Where a conflict is identified, the employee concerned is excluded from the relevant assessment.
5. Complaints regarding price assessments are handled by the editorial team, independently of the commercial team. The complaint-handling procedure is described in Section 11.

11. Complaints and Feedback

SMP welcomes feedback from market participants regarding the accuracy, representativeness, and coverage of its price assessments.

11.1 How to Submit Feedback

1. Email: methodology@supermetalprice.com
2. The subject line should include the relevant metal grade and reporting period (e.g., "Hastelloy G3 Price Report — Week of Apr 13–17, 2026").

11.2 Response Procedure

1. An initial acknowledgment of receipt is provided within two business days for all complaints and methodology inquiries.
2. A substantive response, including any corrective action taken, is provided within ten business days.
3. Where a complaint leads to a methodology change or a price correction, the relevant change is documented in the Methodology Change Log in Section 12 and/or in a correction notice.

11.3 Providing Price Information

Market participants wishing to contribute price data or market information to SMP's price-assessment process may contact the editorial team at the email address above. All submissions are treated as confidential in accordance with the terms described in Section 3.3.

12. Methodology Change Log

Material changes to this methodology are documented below. Except where a change is urgently required or unavoidable in order to maintain the accuracy or integrity of price assessments, subscribers are notified at least 14 days before a material change takes effect.

Version	Date	Description of Change
1.0	May 2026	Initial publication of the price methodology document.

13. Limitations and Disclaimer

13.1 Market Limitations

Specialty-metals markets differ fundamentally from commodity exchanges. Users should be aware of the following characteristics, which affect the accuracy of price assessments:

1. **Low liquidity:** Many specialty-alloy grades trade rarely. A weekly assessment may reflect only a small number of data points and may not capture every transaction occurring during the reporting period.
2. **Wide price ranges:** The assessed price range (low–high) for specialty alloys is often wider than that of exchange-traded commodities. This reflects legitimate sources of variation, including quantity, form (bar, sheet, plate, wire, powder), specification stringency, certification requirements, lead time, and price differences arising from trading relationships.
3. **Scrap quality variation:** Scrap prices are particularly sensitive to quality, contamination level, form (turnings vs. solids), lot size, and location. SMP's scrap price assessments state the assumed quality standard, and actual transaction prices may differ.
4. **Regional spreads:** Prices can vary significantly between regions due to tariffs, freight, regional supply-demand trends, and exchange-rate effects. Where a single global assessment is published, it represents a view weighted toward the principal trading regions.

13.2 Disclaimer

SMP's price assessments are provided for informational purposes only and do not constitute investment advice, a trading recommendation, or a solicitation to buy or sell any commodity. While SMP exercises reasonable care in collecting, validating, and publishing price data, it does not guarantee the accuracy, completeness, or timeliness of any assessed price. Users should exercise independent judgment before making procurement, trading, or investment decisions based on SMP data and should seek professional advice where necessary.

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