

INCOLOY® A-286

UNS S66286 · W.Nr. 1.4980

Age-hardenable Fe–Ni–Cr alloy

High-strength precipitation-hardening alloy for aerospace, turbine, fastener and spring applications.

01 PRODUCT INTRODUCTION

INCOLOY A-286 is an age-hardenable iron-nickel-chromium alloy strengthened by titanium, molybdenum, aluminum, vanadium and boron additions. It combines high tensile and creep strength with useful oxidation and corrosion resistance from cryogenic temperatures to approximately 700°C, depending on load and environment. The alloy is widely used for aerospace and industrial gas-turbine components, high-temperature fasteners, springs, shafts and automotive parts. The final engineering choice should consider product form, heat-treatment condition, design temperature, loading mode, joining method and the applicable ASTM, AMS, ASME or NACE requirement.

02 ENGINEERING POSITION

Core advantage	High-strength elevated-temperature service with oxidation and corrosion resistance
Applications	Aerospace fasteners · turbine blades and vanes · shafts · springs · tail cones · afterburners · automotive components
Material class	Age-hardenable Fe–Ni–Cr alloy

SELECTION NOTE Confirm product form, heat treatment, design code, temperature and actual process chemistry before specification.

03 COMMON INDUSTRY USE

Industry focus	Aerospace fasteners · turbine blades and vanes · shafts · springs · tail cones · afterburners · automotive components
Identity	INCOLOY® A-286 · UNS S66286

Composition & Physical Data

Official limiting composition and typical physical constants.

04 CHEMICAL COMPOSITION

WEIGHT %

Ni	24.0–27.0%	Cr	13.5–16.0%
Ti	1.90–2.35%	Mo	1.00–1.50%
V	0.10–0.50%	Al	≤ 0.35%
C	≤ 0.08%	B	0.003–0.010%

SOURCE CONTROL

Use the applicable ASTM, AMS, ASME or NACE product specification and certified MTR for acceptance.

05 TYPICAL PHYSICAL PROPERTIES

ROOM TEMPERATURE

Density	7.94 g/cm ³	Melting range	Approx. 1430°C
Specific heat	Approx. 435–450 J/kg·°C	Condition	Annealed / aged
Magnetism	Low permeability	Data status	Typical reference

06 MATERIAL IDENTITY

Common name	INCOLOY® alloy A-286
UNS / W.Nr.	S66286 / 1.4980
Alloy family	Age-hardenable Fe–Ni–Cr alloy
Product standard	ASTM A453 · A638 · ASTM B637 · AMS 5525 · 5726 · 5731 · 5732 · 5734 · 5737 · ASME SA-453 / SA-638

ACCEPTANCE RULE

Physical and chemistry references do not replace the certified material test report.

Mechanical & Service Performance

Condition-dependent strength and service-selection guidance.

07 MECHANICAL PROPERTIES

Age-hardened strength depends on product form and treatment; typical tensile strength is approximately 950–1300 MPa after aging.

08 SERVICE PERFORMANCE

Primary service	High-strength elevated-temperature service with oxidation and corrosion resistance
Oxidation / hot corrosion	Assess atmosphere, carburization, nitriding, sulfidation and thermal cycling for hot service.
Aqueous corrosion	Review chlorides, reducing acids, oxidizing salts and intergranular-corrosion condition.
Creep / rupture	Use code-approved allowable stresses and grade-specific long-term data at temperature.
Welded service	Verify filler metal, heat input, post-weld condition and service environment.

09 TYPICAL APPLICATIONS

Industries	Aerospace fasteners · turbine blades and vanes · shafts · springs · tail cones · afterburners · automotive components
Critical review	Review stress state, thermal cycling, galvanic coupling and environmental contaminants.

IMPORTANT

Official bulletin values are representative. Critical service requires code compliance, certified material data and suitable testing.

Fabrication, Welding & Heat Treatment

Practical controls for maintaining alloy performance.

10 FORMING & MACHINING

Cold forming	Use nickel-alloy tooling practice and account for work hardening where applicable.
Hot working	Use grade-specific temperature windows and avoid prolonged reheating.
Machining	Rigid setup, sharp tooling, positive feed and adequate coolant are recommended.

11 WELDING GUIDANCE

Processes	GTAW, GMAW and SMAW may be used with qualified procedures.
Filler metal	Select grade-compatible filler metal and verify service compatibility.
Heat input	Control interpass temperature, dilution and unnecessary reheating.
Cleanliness	Remove oil, grease, oxides and iron contamination before welding.

12 HEAT TREATMENT

Solution treatment followed by precipitation aging, commonly around 705–760°C; verify product-specific cycle and cooling method.

QUALITY CONTROL

Confirm WPS/PQR, filler metal, NDE, heat-treatment records and traceability.

Product Forms, Standards & Procurement

A practical specification and quotation checklist.

13 REFERENCE STANDARDS

ASTM A453 · A638 · ASTM B637 · AMS 5525 · 5726 · 5731 · 5732 · 5734 · 5737 · ASME SA-453 / SA-638

14 COMMON PRODUCT FORMS

Forms	Plate · sheet · strip · bar · wire · pipe · tube · fittings · forgings
Condition	Annealed, solution treated or age hardened by grade and specification

15 RFQ INFORMATION

Material	INCOLOY® A-286 · UNS S66286 · governing ASTM/AMS/ASME specification
Dimensions	Form, OD/ID, wall or thickness, tolerances, length and quantity
Testing	Chemistry, tensile, hardness, PMI, NDE and customer-specific tests
Documents	EN 10204 3.1 MTR, heat traceability and compliance certificates

16 TECHNICAL DISCLAIMER

Values shown are typical or specification-level references and may vary by product form, thickness, heat treatment and governing standard. They do not replace engineering design calculations, corrosion review, applicable codes or the certified material test report.

Source basis	Special Metals technical literature and applicable ASTM / ASME / NACE requirements
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