

INCOLOY® 925

UNS N09925 · W.Nr. —

Age-hardenable Ni–Fe–Cr alloy

High strength and corrosion resistance for sour oil and gas and marine equipment.

01 PRODUCT INTRODUCTION

INCOLOY 925 is an age-hardenable nickel-iron-chromium alloy with molybdenum, copper, titanium and aluminum. Nickel supports chloride SCC resistance; molybdenum and copper improve reducing-acid resistance and localized-corrosion resistance; chromium supports oxidizing environments. Titanium and aluminum provide precipitation strengthening after heat treatment. The alloy is widely used for sour-gas tubulars, valves, hangers, landing nipples, tool joints, packers and high-strength piping. 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	Sulfide stress cracking, chloride SCC, reducing chemicals and high-strength service
Applications	Sour-gas wells · down-hole tools · valves · fasteners · marine shafting · high-strength piping
Material class	Age-hardenable Ni–Fe–Cr alloy

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

03 COMMON INDUSTRY USE

Industry focus	Sour-gas wells · down-hole tools · valves · fasteners · marine shafting · high-strength piping
Identity	INCOLOY® 925 · UNS N09925

Composition & Physical Data

Official limiting composition and typical physical constants.

04 CHEMICAL COMPOSITION

WEIGHT %

Ni	42–46%	Cr	19.5–22.5%
Fe	≥ 22%	Mo	2.5–3.5%
Cu	1.5–3.0%	Ti	1.9–2.4%
Al	0.1–0.5%	C	≤ 0.03%

SOURCE CONTROL

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

05 TYPICAL PHYSICAL PROPERTIES

ROOM TEMPERATURE

Density	8.08 g/cm ³	Melting range	1311–1366°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 925
UNS / W.Nr.	N09925 / —
Alloy family	Age-hardenable Ni–Fe–Cr alloy
Product standard	Product-specific ASTM / NACE requirements; verify the purchase specification for sour service

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

Solution-annealed plus aged product is used for high strength; exact minimums depend on product form and internal or customer specification.

08 SERVICE PERFORMANCE

Primary service	Sulfide stress cracking, chloride SCC, reducing chemicals and high-strength service
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	Sour-gas wells · down-hole tools · valves · fasteners · marine shafting · high-strength piping
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 controlled aging; hardness and NACE requirements must be checked for sour service.

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

Product-specific ASTM / NACE requirements; verify the purchase specification for sour service

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® 925 · UNS N09925 · 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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