

SOUTHERLY ALLOY

Incoloy 825 Bar and Rod | UNS N08825 | W.Nr. 2.4858

ASTM B425 / ASME SB425 — Nickel-Iron-Chromium-Molybdenum-Copper Alloy Rod and Bar for Acid and Seawater Service

Product Description

Incoloy 825 is a titanium-stabilised nickel-iron-chromium alloy with molybdenum and copper additions that resist reducing and oxidising acids, chloride pitting and stress-corrosion cracking. Southerly Alloy supplies UNS N08825 bar and rod to ASTM B425 in annealed, hot-finished and cold-drawn conditions, with custom sizes, surface finishes and mill test documentation.

Chemical Composition (heat analysis per ASTM B425, UNS N08825)

Element	Content
Nickel (Ni)	38.0–46.0%
Chromium (Cr)	19.5–23.5%
Iron (Fe)	22.0% min.
Molybdenum (Mo)	2.5–3.5%
Copper (Cu)	1.5–3.0%
Titanium (Ti)	0.6–1.2%
Carbon (C), max.	0.05%
Manganese (Mn), max.	1.00%
Silicon (Si), max.	0.50%
Aluminium (Al), max.	0.20%
Sulfur (S), max.	0.03%

Molybdenum and copper set the acid-resistance balance; titanium stabilises the structure against intergranular attack. The mill test certificate governs final acceptance.

Mechanical Properties of Rods and Bars (ASTM B425)

Condition	Tensile Strength	Yield Strength (0.2%)	Elongation	Hardness
Annealed — ASTM B425 minimum	≥85 ksi (586 MPa)	≥35 ksi (241 MPa)	30%	200 HB max.
Annealed bar — typical values	100 ksi (690 MPa)	47 ksi (324 MPa)	45%	Approx. 75 HRB

Alloy 825 is not age-hardenable; strength above the annealed minimum comes from cold work. Sour-service bar is usually ordered to a hardness ceiling as well as a strength floor.

Physical Properties (typical room-temperature values)

Property	Value
Density	Approx. 8.14 g/cm ³
Melting range	Approx. 1370–1400 °C
Modulus of elasticity	Approx. 196 GPa
Thermal conductivity at 20 °C	Approx. 11.1 W/m-K
Specific heat at 20 °C	Approx. 440 J/kg-K
Electrical resistivity at 20 °C	Approx. 1.13 μΩ-m
Thermal expansion, 20–100 °C	Approx. 14.1 μm/m-K
Curie temperature	Below –196 °C
Magnetic behaviour	Non-magnetic at ambient temperature

Applicable Standards

Standard / Designation	Scope
ASTM B425	Nickel-iron-chromium-molybdenum-copper alloy rod and bar — UNS N08825
ASME SB425	ASME edition for rod and bar
ASTM B564 / ASME SB564	Nickel alloy forgings — UNS N08825
ASTM B424 / B163 / B423	Plate, sheet, seamless tube and pipe in the same grade
NACE MR0175 / ISO 15156	Sour service in oil and gas production
UNS N08825	Material designation for Incoloy 825
W.Nr. 2.4858 / NiCr21Mo	European designation for Alloy 825
BS 3076 NA16 / VdTÜV 432	British bar and German pressure vessel designations
DIN 17752 / 17753 / 17754	Wrought nickel alloys — bar, wire and forging stock
ISO 9723 / 9724 / 9725	Nickel alloy bar, wire and forging stock
JIS NCF 825	Japanese designation

Available Dimensions & Forms

Product Form	Typical Supply	Length
Round Bar	6–500 mm dia.	Cut to length or random
Round Rod	3–50 mm dia.	Cut to length
Bright Bar	6–150 mm dia.	Cut to length or random
Square Bar	10–150 mm	Cut to length or random
Hex Bar	10–150 mm A/F	Cut to length or random
Flat Bar	3–100 mm thick × 10–300 mm wide	Cut to length
Forged Bar	100–500 mm dia. or forged section	Cut to length
Precision-Ground Rod	3–100 mm dia., tight tolerance	Cut to length

Availability depends on delivery condition and order quantity; tolerances follow ASTM B425 for the ordered condition.

Surface Finishes

Surface Condition	Typical Use
Annealed and pickled	Standard delivery for acid and seawater service
Hot-worked (as-rolled or forged)	Supplied as-worked for parts that will be machined to size
Cold drawn	Close diameter control with a brighter surface
Peeled	Machined skin with uniform diameter for further turning
Centreless ground	Tight diameter and straightness for shafting
Polished	Reduced roughness for product-contact and visible parts
Rough turned	Machining allowance held on large or forged bar

Southerly Alloy — nickel alloy bar, rod, pipe, tube, plate and fittings · www.southerly-alloy.com · Values are for reference; the mill test certificate prevails for final acceptance.