SOUTHERLY ALLOY

Hastelloy B-3 Plate and Sheet | UNS N10675 | Werkstoff Nr. 2.4600 | NiMo29

ASTM B333 / ASME SB333 (with B906) — Rolled Plate, Sheet, and Strip

Product Description

Hastelloy B-3 plate and sheet carries UNS N10675 as flat-rolled product to ASTM B333, from 4.76 to 63.5 mm plate down through light sheet and strip. A welded lining rarely gets a second anneal once it sits in place, so the chromium window carries real value here: the sheet keeps its own ductility into service. Flat product serves reactor linings, column trays, scrubber shells, storage tanks, and pharmaceutical vessels in reducing acid duty. Cut-to-size plate and edge condition are agreed with the order.

Chemical Composition

Element	Content (UNS N10675)	Element	Content (UNS N10675)
Nickel (Ni)	65.0% min.	Molybdenum (Mo)	27.0–32.0%
Chromium (Cr)	1.0–3.0%	Iron (Fe)	1.0–3.0%
Tungsten (W)	3.0% max.	Cobalt (Co)	3.0% max.
Manganese (Mn)	3.0% max.	Carbon (C)	0.01% max.
Silicon (Si)	0.10% max.	Phosphorus (P)	0.030% max.
Sulfur (S)	0.010% max.	Vanadium (V)	0.20% max.
Aluminum (Al)	0.50% max.	Titanium (Ti)	0.20% max.
Copper (Cu)	0.20% max.	Columbium (Nb)	0.20% max.
Tantalum (Ta)	0.20% max.	Zirconium (Zr)	0.10% max.
Nickel plus Molybdenum (Ni + Mo)	94.0–98.0%		

Chromium between 1 and 3% is the deliberate addition that puts this grade ahead of earlier B-type alloys, and carbon at 0.01% supports it. ASTM B335 and B333 share this one composition table, so every product form meets the same window.

Minimum Room-Temperature Mechanical Properties

Standard / Form and Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation / Hardness, min.
Plate, ASTM B333 – solution annealed, 4.76–63.5 mm	≥ 110 ksi (760 MPa)	≥ 51 ksi (350 MPa)	40%, 100 HRB max.
Sheet and strip, ASTM B333 – solution annealed, under 4.76 mm	≥ 110 ksi (760 MPa)	≥ 51 ksi (350 MPa)	40%, 100 HRB max.

Plate and light flat product share one set of minima, so the ordered thickness decides which row applies. Deep-drawing sheet carries a grain size requirement beside the tensile figures, and the grade has no aging response.

Physical Properties (typical values)

Property	Value
Density	Approx. 9.22 g/cm³
Melting range	Approx. 1370–1418 °C
Modulus of elasticity	Approx. 216 GPa
Modulus of rigidity	Approx. 83 GPa
Thermal conductivity at 20 °C	Approx. 11.2 W/m·K
Electrical resistivity at 20 °C	Approx. 1.37 µΩ·m
Thermal expansion, 25–100 °C	Approx. 10.6 µm/m·°C
Magnetic behaviour	Essentially non-magnetic in the annealed condition
Strengthening route	Cold work only

Typical room-temperature values drawn from the published Haynes data for the grade. They support design work rather than acceptance testing. Specific heat is omitted because the available sources disagree; confirm it with the mill when a design calculation needs it.

Applicable Standards

Standard / Designation	Scope
ASTM B333 / ASME SB333	Plate, sheet, and strip in hot-rolled or cold-rolled condition
ASTM B906	General requirements for flat-rolled nickel alloys, and the product-form definitions
ASTM E112	Average grain size determination for sheet and strip
ASTM B335 / B622 / B619 / B626	Rod, seamless tube, welded pipe, and welded tube
ASTM B564 / B366	Forgings, and factory-made wrought fittings
DIN 17750 · ISO 6208	Flat-product standards for wrought nickel alloys
NACE MR0175 / ISO 15156	Sour service review where the order requires it
SAE AMS	No aerospace specification covers this grade

Neither grade tolerates an oxidant, so ferric or cupric contamination and wet chlorine stay outside the envelope. No iron or copper may contact a hydrochloric acid circuit, because the salts that form attack the low-chromium matrix. Service temperature: roughly –200 to +400 °C depending on load and medium, and hotter duties need verification before ordering. Solution annealing sits near 1066 °C (1950 °F) followed by a rapid water quench, which dissolves any ordered phase that forming or welding introduced. Filler metal: ERNiMo-7 to AWS A5.14, or ENiMo-7 electrodes to AWS A5.11.

Typical Supply Dimensions

Product Form	Typical Supply Range
Plate	4.76–63.5 mm thick, width above 250 mm
Sheet	Under 4.76 mm thick, width from 600 mm
Strip	Under 4.76 mm thick, width under 600 mm
Cut plate	Sheared or plasma cut to ordered length and width
Coil	Strip supplied coiled for press and lining work

Thickness and width together fix the product name, so an order has to state both. Coil delivery is a packaging choice and does not change the defined form.

Surface Finishes

Surface Condition	Typical Use
Annealed and pickled	Standard delivery for hydrochloric and sulfuric acid service
Hot-rolled and descaled	Parts that will be machined or further formed
Cold-rolled, bright finish	Uniform face for vessel internals and visible panels
Bright annealed	Scale-free surface for clean and product-contact service
Polished	Reduced roughness for high-purity and decorative work