SOUTHERLY ALLOY

Hastelloy B-2 Plate and Sheet | UNS N10665 | Werkstoff Nr. 2.4617 | NiMo28

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

Product Description

Hastelloy B-2 plate and sheet carries UNS N10665 as flat-rolled product to ASTM B333. Thickness and width together fix the classification, with plate starting at 4.76 mm and running to 63.5 mm, and sheet or strip sitting under that. Flat product lines reactors, column trays, scrubber housings, and storage tanks in reducing acid service. Forming and welding heat must pass through the 540 to 815 °C band quickly, so a welded lining is best planned around a solution anneal and quench.

Chemical Composition

Element	Content (UNS N10665)	Element	Content (UNS N10665)
Nickel (Ni)	Balance	Molybdenum (Mo)	26.0–30.0%
Iron (Fe)	2.0% max.	Chromium (Cr)	1.0% max.
Cobalt (Co)	1.00% max.	Manganese (Mn)	1.0% max.
Carbon (C)	0.02% max.	Silicon (Si)	0.10% max.
Phosphorus (P)	0.04% max.	Sulfur (S)	0.03% max.

Nickel makes up the balance of the melt. Iron and chromium stay low because together they drive Ni4Mo formation, which is the reaction this grade exists to avoid. The composition table is shared by ASTM B335 and B333, so one window governs every product form.

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. 1330–1380 °C
Modulus of elasticity	Approx. 217 GPa
Thermal conductivity at 0 °C	Approx. 11.1 W/m·K
Thermal conductivity at 100 °C	Approx. 12.2 W/m·K
Specific heat at 100 °C	Approx. 389 J/kg·K
Electrical resistivity at 20 °C	Approx. 1.37 µΩ·m
Thermal expansion, 20–93 °C	Approx. 10.3 µm/m·°C
Magnetic behaviour	Non-magnetic in the annealed condition
Strengthening route	Cold work only

Typical room-temperature values drawn from the published Haynes and mill data for the grade. They support design work rather than acceptance testing. The alloy has no aging response, so cold work sets every figure above the annealed minimum.

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: exposure between 540 and 815 °C (1000–1500 °F) must be avoided in every case, because Ni4Mo ordering there costs ductility permanently. In oxidizing atmospheres such as air the ceiling is about 540 °C; in reducing gas or under vacuum the grade runs hotter. Solution annealing sits near 1065 °C (1950 °F) followed by a rapid water quench, and no stress-relief anneal applies at intermediate temperature. 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