

SOUTHERLY ALLOY

Nickel 200 / Nickel 201 Plate and Sheet | UNS N02200 / N02201 | Werkstoff Nr. 2.4066 / 2.4068

ASTM B162 / ASME SB162 — Plate, Sheet, and Strip

Product Description

Nickel 200 and Nickel 201 plate and sheet serve vessel shells, linings, and formed panels that meet caustic or reducing media. Annealed stock draws and spins without intermediate annealing, and strip arrives in quarter-hard through spring temper where a part needs strength as rolled. Above 315 °C, hot caustic and process duty calls for the low-carbon grade 201.

Chemical Composition

Element	Nickel 200 (UNS N02200)	Nickel 201 (UNS N02201)
Nickel (Ni), min.	99.0%	99.0%
Copper (Cu), max.	0.25%	0.25%
Iron (Fe), max.	0.40%	0.40%
Manganese (Mn), max.	0.35%	0.35%
Carbon (C), max.	0.15%	0.02%
Silicon (Si), max.	0.35%	0.35%
Sulfur (S), max.	0.01%	0.01%

Nickel is determined by difference and includes cobalt. The same composition table appears in ASTM B160, B161, B162, and B163.

Minimum Room-Temperature Mechanical Properties (ASTM B162)

Grade / Product / Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation, min.
Grade 200, hot-rolled plate, annealed	≥ 55 ksi (380 MPa)	≥ 15 ksi (100 MPa)	40%
Grade 200, hot-rolled plate, as rolled	≥ 55 ksi (380 MPa)	≥ 20 ksi (135 MPa)	30%
Grade 200, hot-rolled sheet, annealed	≥ 55 ksi (380 MPa)	≥ 15 ksi (100 MPa)	40%
Grade 200, cold-rolled sheet, annealed	≥ 55 ksi (380 MPa)	≥ 15 ksi (100 MPa)	40%
Grade 200, cold-rolled strip, annealed	≥ 55 ksi (380 MPa)	≥ 15 ksi (100 MPa)	40%
Grade 200, sheet and strip, hard temper	≥ 90 ksi (620 MPa)	≥ 70 ksi (480 MPa)	2%
Grade 201, hot-rolled plate, annealed	≥ 50 ksi (345 MPa)	≥ 12 ksi (80 MPa)	40%
Grade 201, hot-rolled plate, as rolled	≥ 50 ksi (345 MPa)	≥ 12 ksi (80 MPa)	30%
Grade 201, hot-rolled sheet, annealed	≥ 50 ksi (345 MPa)	≥ 12 ksi (80 MPa)	40%
Grade 201, cold-rolled strip, annealed	≥ 50 ksi (345 MPa)	≥ 12 ksi (80 MPa)	40%

The B162 yield requirement is waived below 0.51 mm (0.020 in.) thickness. Sheet and strip between 0.25 mm and 1.2 mm carry a 30% elongation minimum, material between 1.3 mm

and 2.7 mm carries 35%, and strip under 0.25 mm carries no tensile requirement. Strip tempers run quarter-hard 70–80 HRB, half-hard 79–86 HRB, three-quarter-hard 85–91 HRB, and spring temper 95 HRB minimum.

Physical Properties (typical values)

Property	Nickel 200 (N02200)	Nickel 201 (N02201)
Density	Approx. 8.89 g/cm ³	Approx. 8.89 g/cm ³
Melting range	Approx. 1435–1446 °C	Approx. 1435–1446 °C
Specific heat, 20 °C	Approx. 456 J/kg·K	Approx. 456 J/kg·K
Curie temperature	Approx. 360 °C (680 °F)	Approx. 360 °C (680 °F)
Modulus of elasticity	Approx. 205 GPa	Approx. 207 GPa
Thermal conductivity, 20 °C	Approx. 70.3 W/m·K	Approx. 79.3 W/m·K
Electrical resistivity, 20 °C	Approx. 0.096 μΩ·m	Approx. 0.085 μΩ·m
Thermal expansion, 20–100 °C	Approx. 13.3 μm/m·K	Approx. 13.2 μm/m·K
Poisson's ratio	Approx. 0.29	Approx. 0.29
Magnetic behaviour	Ferromagnetic at room temperature	Ferromagnetic at room temperature

Typical values for annealed material at room temperature, given for design work rather than acceptance testing. The two grades differ most in thermal conductivity and electrical resistivity.

Applicable Standards

Standard / Designation	Scope
ASTM B162 / ASME SB162	Plate, sheet, and strip — UNS N02200 and N02201
SAE AMS 5553	Low-carbon nickel sheet and strip 0.03–0.65 mm — grade 201 only; plate excluded and grade 200 not covered
DIN 17750 / ISO 6208	Flat-rolled nickel product — plate, sheet, and strip
DIN 17740	Wrought nickel — chemical composition
BS 3072 / 3073 (NA12)	British flat-rolled nickel product standard
VdTÜV 345 · JIS G 4901	Wrought nickel delivery conditions; Japanese plate, sheet, and strip standard

AMS 5553 covers grade 201 sheet and strip between 0.03 mm and 0.65 mm alone, so it does not reach plate, and grade 200 carries no aerospace material specification of its own.

Service ceiling: ASME Section VIII Division 1 approves Nickel 200 to 600 °F (315 °C) and Nickel 201 to 1250 °F (677 °C). Above 315 °C, carbon leaves solution as graphite along the grain boundaries of grade 200, so continuous hot duty calls for grade 201. Grade 201 is sensitive to sulfide-bearing atmospheres above 315 °C, and wet hydrofluoric acid and oxidizing acids fall outside the envelope for both grades.

Typical Supply Dimensions

Product Form	Thickness	Width	Length
Plate	4.76–50 mm	Up to 2500 mm	Up to 6000 mm
Sheet	0.5–4.76 mm	Up to 1250 mm	Up to 2500 mm
Strip	0.13–3.2 mm	Up to 600 mm	Coil

Plate thickness is measured before leveling. Flatness and edge condition are agreed at quotation, and ultrasonic examination is available for coded pressure work.

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