

Incoloy® 800H / 800HT (UNS N08810 / N08811) — Material Data Sheet

ASTM B408 · UNS N08810 / N08811 · Alloys 800H and 800HT

Controlled-carbon nickel-iron-chromium alloy for creep service

Incoloy 800 with controlled carbon and grain size for creep strength above 1100 °F — the furnace, reformer and heat-treatment fixture alloy, weldable and stable to 1800 °F.

TENSILE, ANNEALED	65 ksi min	SERVICE	Creep-rated above 1100 °F, oxidation to 1800 °F
YIELD, ANNEALED	25 ksi min	NICKEL	30–35 %
CARBON	0.06–0.10 % (800HT)	MAGNETIC	No

Nominal composition

■ Fe balance ~ 42.9%
 ■ Ni ~ 32.50%
 ■ Cr ~ 21.00%
 ■ Al+Ti ~ 1.02%
 ■ Mn ~ 0.75%
 ■ Si ~ 0.50%
 ■ C, S, P, Cu, Al, Ti trace

Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — Incoloy® 800H / 800HT (UNS N08810 / N08811)

Element	Symbol	Min %	Max %
Carbon	C	0.06	0.10
Manganese	Mn	—	1.5
Silicon	Si	—	1.0
Sulfur	S	—	0.015
Phosphorus	P	—	0.045
Chromium	Cr	19.0	23.0
Nickel	Ni	30.0	35.0
Copper	Cu	—	0.75
Aluminium	Al	0.25	0.60
Titanium	Ti	0.25	0.60
Aluminium + titanium	Al+Ti	0.85	1.20
Iron	Fe	39.5	—

Values per ASTM B408-22 Table 6 for UNS N08811 (verified against the specification); N08810 (800H) has carbon 0.05–0.10 %, Al and Ti 0.15–0.60 % each, and no Al + Ti minimum; the Al + Ti 0.85–1.20 % row applies to N08811 only.

Physical properties (typical)

DENSITY	0.287 lb/in ³ (7.94 g/cm ³)
MODULUS OF ELASTICITY	28.5 × 10 ⁶ psi (196 GPa)
THERMAL EXPANSION (68–212 °F)	7.9 µin/in·°F
MAGNETIC	No

Heat treatment

Solution annealed at 2050 °F minimum (800H, N08810) or 2100 °F minimum (800HT, N08811) for a grain size of ASTM 5 or coarser, which is what gives the creep strength (B408 clauses 5.1.2, 5.1.3 and 7.2). Not hardenable by heat treatment.

Mechanical properties — Incoloy® 800H / 800HT (UNS N08810 / N08811)

Condition and nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation, min (%)	Reduction of area, min (%)	Hardness
Annealed, cold or hot worked — all	65	25	30	—	—

Values per ASTM B408-22 Table 5 for annealed rod and bar (verified against the specification).

Applicable standards

ASTM B408	Nickel-iron-chromium alloy rod and bar (N08810, N08811)
ASME SB-408 / SECTION II	Code allowable stresses to 1650 °F and beyond for 800H/HT
ASTM B564	Nickel alloy forgings

Forms we supply in Incoloy 800H/HT

- Studs and stud bolts
- Hex and heavy hex bolts
- Nuts and washers
- Socket head cap screws
- Machined components from certified bar

Typical applications

- Reformer and ethylene furnace hardware
- Heat-treatment fixtures, baskets and trays
- Superheater and exchanger bolting
- Petrochemical process equipment above 1100 °F
- Nuclear steam-generator components