

410 Stainless Steel Heat Treatment

The chemistry, the hardening cycle and the tempering response of type 410 martensitic stainless steel, from the reference page on aobosteel.com. A reference summary of published practice and not an Aobo Steel specification.

Reference only. The chemistry, the hardening cycle and the tempering response are reproduced from the source named at the foot of this sheet. The figures are shop reference values rather than a specification, and the card carries no tolerances. Run a trial part before committing production work to this cycle.

Chemistry of 410

Source, heat treating reference information for type 410 stainless steel, printed page 200.

Element	Percent
Carbon	0.15
Manganese	1.00
Silicon	1.00
Chromium	11.50
Phosphorus	0.04 max
Sulfur	0.03 max

The card prints one figure for each element rather than a specification range. Molybdenum, vanadium and tungsten are listed on the card with no figure against them, so those rows are left out of the table instead of being printed as blanks. Phosphorus and sulfur are printed as maxima.

Hardening 410

Source, heat treating reference information for type 410 stainless steel, printed page 200.

Step	410
Preheat	1200 °F (650 °C)
Harden	1850 °F (1010 °C)
Quench	Air or oil quench

The card prints one preheat step, one hardening temperature and two quench media for the grade, with no section size condition against any of them, so the figures stand for the load as written.

Tempering response of 410

Source, heat treating reference information for type 410 stainless steel, printed page 200.

Temper, °F	°C	410, BHN
As quenched	—	220
300	150	220
400	205	220
500	260	220
600	315	220
700	370	220
800	425	230
900	480	239
1000	540	185

The card prints 220 BHN for the as quenched condition, the same figure the table repeats at every step from 300 °F to 700 °F. The hardness is printed in Brinell on the card rather than in Rockwell C, and no tolerance band appears against any row.

The card is the lowest carbon grade in the martensitic stainless family, carrying 0.15% carbon with 11.50% chromium, and it hardens in air or oil from 1850 °F (1010 °C) after a 1200 °F (650 °C) preheat. The tempering line holds 220 BHN from the as quenched condition through 700 °F (370 °C), rises to 239 BHN at 900 °F (480 °C) and drops to 185 BHN at 1000 °F (540 °C), with the hardness printed in Brinell and no tolerance band on any row.

Aobo Steel, tool steel supplier

Aobo Steel supplies tool steel to distributors and mold, tool and die shops, including D2, D3, O1, O2, A2, S7, H13, H11, M2, L6, P20 and 420 and 440C stainless. Forged or hot rolled, annealed or pre-hardened, cut to your sizes, with test certificates.

Reference data compiled from Heat Treatment, Selection, and Application of Tool Steels (William E. Bryson, second edition, Carl Hanser Verlag, 2009). The chemistry, the hardening cycle and the tempering response for type 410 come from the heat treating reference information on printed page 200.

CONTACT

EMAIL
sales@aobosteel.com

WHATSAPP
[+86 180 6294 5370](https://wa.me/8618062945370)

WEB
aobosteel.com



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