

H19 Tool Steel Heat Treatment

The chemistry, the hardening cycle and the tempering response of H19 heavy duty hot work tool 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 H19

Source, heat treating reference information for H19, printed page 188.

Element	Percent
Carbon	0.42
Manganese	0.31
Silicon	0.21
Chromium	4.12
Molybdenum	0.46
Vanadium	2.19
Tungsten	4.26
Cobalt	4.16

The card prints sulfur with no figure against it, so that row is left out rather than printed blank. The card gives a single figure for each element where a standard gives a range, and the figure on each row here falls inside the range the tool steel composition chart on this site carries for H19, which writes the chromium range as 4.00 to 4.75 percent, the tungsten range as 3.75 to 4.50 percent, the vanadium range as 1.75 to 2.20 percent and the cobalt range as 4.00 to 4.50 percent against UNS T20819. Composition data is for general reference only, actual values vary by standard, mill and heat number, so confirm the figures against the material test certificate of the heat or ask Aobo Steel.

Hardening H19

Source, heat treating reference information for H19, printed page 188.

Step	H19
Preheat	1500 °F (815 °C)
Harden	2150 °F (1175 °C)
Quench	Oil or salt 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. Both media named on the card cool faster than air, which is the point of the grade rather than an accident of the card.

Tempering response of H19

Source, heat treating reference information for H19, printed page 188.

Temper, °F	°C	H19, HRC
As quenched	–	53
600	315	52
700	370	51
800	425	51
900	480	51
1000	540	56
1100	595	57

The card prints a Rockwell C figure on every row and no tolerance band against any of them. The line falls from the as quenched figure over the first four rows and then climbs to the highest figure on the card at 1100 °F (595 °C), which is the top of the range the card prints.

The card is the hot work grade that carries tungsten and cobalt on top of chromium, with 0.42 percent carbon, 4.12 percent chromium, 4.26 percent tungsten and 4.16 percent cobalt. It hardens in oil or salt from 2150 °F (1175 °C) after a 1500 °F (815 °C) preheat, and the tempering line runs from 53 HRC as quenched down to 51 HRC at 900 °F (480 °C) and then back up to 57 HRC at 1100 °F (595 °C), which is the top of the range the card prints.

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 H19 come from the heat treating reference information on printed page 188.

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