

S5 Tool Steel Heat Treatment

The chemistry, the hardening cycle and the tempering response for S5, 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 a production tool to this cycle.

Chemistry of S5

Source, heat treating reference information for S5, printed page 196.

Element	Percent
Carbon	0.60
Manganese	0.90
Silicon	1.90
Chromium	0.20
Molybdenum	1.30
Vanadium	0.30

The card prints one figure for each element rather than a specification range. Tungsten, cobalt and sulfur appear on the card with no figure against them and are left out of the table rather than shown as a zero.

Hardening S5

Source, heat treating reference information for S5, printed page 196.

Step	S5
Preheat	1200 °F (650 °C)
Harden	1725 °F (940 °C)
Quench	Oil quench

The card attaches no size condition to the preheat, so the step is not marked as one that only larger sections need. It prints one hardening temperature and one quench medium for the grade, with no air or salt alternative alongside the oil quench.

Tempering response of S5

Source, heat treating reference information for S5, printed page 196.

Temper, °F	°C	S5, HRC
As quenched	No temper	61
300	150	60
400	205	59
600	315	57
800	425	52
1000	540	47
1200	650	41

The card steps the tempering temperatures by 100 °F from 300 °F to 1200 °F and prints one Rockwell C figure on each row, with no row at 500 °F or 700 °F. The first row is the hardness as quenched, before any temper.

S5 sits at 61 HRC as quenched and the oil quench is the only medium the card prints for the grade. The line falls to 52 HRC at 800 °F (425 °C) and to 41 HRC at 1200 °F (650 °C), so a shock tool that has to hold up in service is tempered well up the range.

Aobo Steel, tool steel supplier

Aobo Steel supplies tool steel to distributors and mold, tool and die shops, including D2, D3, O1, A2, H13, H11, M2, L6, P20 and 420 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, Hanser). The chemistry, the hardening cycle and the tempering response for S5 come from the heat treating reference information on printed page 196.

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