

D5 and D7 Tool Steel Heat Treatment

The preheat, the hardening temperature and the quench medium for D5 and D7, with the hardness each tempering temperature leaves on them, from the reference page on aobosteel.com. A reference summary of published practice and not an Aobo Steel specification.

Reference only. The hardening card, the tempering response and the chemistry are reproduced from the source named at the foot of this sheet. Published heat treatment data for these two grades differs between sources, and this source itself reads two ways on the quench for D7. Both readings are printed here as published. Run a trial part before committing a die section to this cycle.

Hardening the two grades

Source, heat treating reference information for D5 and D7, printed pages 185 and 186.

Step	D5	D7
Preheat	1200 °F (650 °C)	1400 °F (760 °C)
Harden	1850 °F (1010 °C)	1975 °F (1080 °C)
Quench	Oil or air	Air

The card gives one preheat temperature, one hardening temperature and one quench medium for each grade. The selection chapter of the same source describes D7 as an oil hardening grade that can be quenched in air at a sacrifice of hardness, while the card lists air. The card value is printed in the table and the second reading is recorded here.

Tempering response of D5 and D7

Source, heat treating reference information for D5 and D7, printed pages 185 and 186.

Temper, °F	°C	D5, HRC	D7, HRC
As quenched	No temper	64	67
300	150	62	65
400	205	61	63
500	260	61	62
600	315	60	61
700	370	60	61
800	425	61	61
900	480	61	62
1000	540	57	62

The card prints a single Rockwell C figure for each tempering temperature. The D5 line falls to 60 HRC at 700 °F (370 °C) and then rises again, which is secondary hardening.

D5 and D7 are the two high chromium cold work grades of the D group. D7 holds between 61 and 62 HRC from 600 to 1000 °F (315 to 540 °C); the D5 line falls to 60 HRC at 700 °F (370 °C) and then rises again.

Chemistry of the two grades

Source, heat treating reference information for D5 and D7, printed pages 185 and 186.

Grade	C	Mn	Si	Cr	Mo	V	W	Co
D5	1.50	0.50	0.50	12.25	0.85	Not given	Not given	3.10
D7	2.30	0.40	0.40	12.50	1.10	4.00	Not given	Not given

Both lines are printed as single figures in the reference section, not as the specification ranges. Cells the card leaves empty are shown as Not given rather than as a zero. The ranges for the same two grades are on the tool steel composition chart.

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, 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 hardening card and the tempering response for D5 and D7 come from the heat treating reference information on printed pages 185 and 186, and the grade notes from the tool steel selection chapter on printed pages 148 and 149.

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