

Tungsten High Speed Steel Tempering Chart

The hardness each tempering temperature leaves on the tungsten high speed steels T1, T5 and T15, with the hardening window and the quench medium that go with them, from the reference page on aobosteel.com. A reference summary of published practice and not an Aobo Steel specification.

Reference only. The hardening window, the tempering table and the chemistry are reproduced from the source named at the foot of this sheet. Published tempering charts for these grades differ at the edges, and the source itself prints a second set of tempering values in its selection chapter. Both sets are printed here as published. Run a trial part before committing a die section to this cycle.

Tempering chart for T1, T5 and T15

Source, heat treating reference information for T1, T5 and T15, printed pages 197 and 198.

Temper, °F	°C	T1, HRC	T5, HRC	T15, HRC
As quenched	No temper	65	65	65
900	480	66	67	67
950	510	68	67	67
1000	540	67	66	67
1050	565	66	66	66
1100	595	62	64	64
1150	620	58	60	60
1200	650	52	56	56

The source prints the 1150 °F line for T15 as 1150F/620°C, without the degree symbol. The line is shown here as published and the temperature is the one the rows around it give.

The selection chapter of the same source prints a second tempering set for these grades on a different basis and marks 1000 °F (540 °C) as the optimum temper for all three, giving T1 at 64 HRC, T5 at 64 HRC and T15 at 67 HRC at that temperature. That set runs from 900 °F (480 °C) and stops at 1200 °F (650 °C) for T1 and at 1150 °F (620 °C) for T5 and T15.

The T series is the tungsten branch of the high speed steels. Hardness peaks at 950 to 1000 °F (510 to 540 °C) and falls away above 1100 °F (595 °C).

Hardening the tungsten grades

Source, heat treating reference information for T1, T5 and T15, printed pages 197 and 198.

Step	T1	T5	T15
Preheat	1500 °F (815 °C)	1500 °F (815 °C)	1500 °F (815 °C)
Austenitize	2250 °F (1230 °C)	2350 °F (1290 °C)	2250 °F (1230 °C)
Quench	Oil or salt	Oil or salt	Oil or salt

The reference section gives one preheat and one austenitizing temperature for each grade and oil or salt as the quench. T5 is the one grade of the three that is austenitized 100 °F (55 °C) above the other two.

Chemistry of the three grades

Source, heat treating reference information for T1, T5 and T15, printed pages 197 and 198.

Grade	C	Mn	Si	Cr	Mo	V	W	Co
T1	0.75	0.30	0.30	4.00	0.70	1.00	18.00	—
T5	0.80	0.30	0.30	4.00	0.80	2.00	18.00	8.00
T15	1.50	0.30	0.30	4.00	0.50	5.00	12.00	5.00

All three lines are printed as single figures in the reference section, not as the specification ranges. The ranges for the same three grades are on the tool steel composition chart.

Aobo Steel, tool steel supplier

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Reference data compiled from Heat Treatment, Selection, and Application of Tool Steels (William E. Bryson, second edition, Hanser). The chemistry, hardening window and tempering table for T1, T5 and T15 come from the heat treating reference information on printed pages 197 and 198, and the grade notes from the tool steel selection chapter on printed pages 158, 161 and 162.

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