

Chinese Carbon Tool Steel Grades T7 to T13, Hardening and Tempering

The T series is the Chinese plain carbon tool steel family and the group that answers to AISI W1 on a European or American drawing. Composition, recommended hardening temperature and hardness after tempering for the seven grades, read from the searchable text layer of a Chinese mould and tool steel heat treatment handbook. Reference data only, not an Aobo Steel specification.

Reference only. This sheet is a reference summary of published Chinese handbooks and standards practice, not an Aobo Steel specification. Confirm the grade and the heat treatment against the mill certificate and the governing drawing before an order or a production run is set against them.

Chemical composition

Grade	C	Si	Mn	P	S
T7	0.65 to 0.74	0.35 max	0.40 max	0.035 max	0.030 max
T8	0.75 to 0.84	0.35 max	0.40 max	0.035 max	0.030 max
T9	0.85 to 0.94	0.35 max	0.40 max	0.035 max	0.030 max
T10	0.95 to 1.04	0.35 max	0.40 max	0.035 max	0.030 max
T11	1.05 to 1.14	0.35 max	0.40 max	0.035 max	0.030 max
T12	1.15 to 1.24	0.35 max	0.40 max	0.035 max	0.030 max
T13	1.25 to 1.35	0.35 max	0.40 max	0.035 max	0.030 max

Table 4-1 and Table 4-64, printed pages 92 and 96. Values are mass percent.

Recommended hardening temperature

Grade	Water, brine or caustic quench, °C	Hardness HRC	Oil or hot bath quench, °C	Hardness HRC
T7	800 to 830	61 to 63	810 to 840	60 to 63
T8	750 to 800	62 to 64	800 to 820	60 to 63
T9	770 to 790	62 to 64	790 to 810	62 to 64
T10	770 to 790	62 to 64	790 to 810	62 to 64
T11	770 to 790	62 to 64	790 to 810	62 to 64
T12	770 to 790	62 to 64	790 to 810	62 to 64
T13	770 to 790	62 to 64	790 to 810	62 to 64

Tables 4-9, 4-20, 4-27, 4-38, 4-48, 4-60 and 4-68, printed pages 97 to 111. The brine variant of the fast route is published at 62 to 65 HRC for T8 to T13.

Chinese carbon tool steel T7 to T13, continuation

Hardness after tempering

Grade	100 °C	150 °C	200 °C	250 °C	300 °C	350 °C	400 °C	450 °C	500 °C	550 °C	600 °C
T7	62	-	60	-	51.5	-	43	-	33	28	22
T8	62	60.5	60	-	53	-	44	-	38	31	27
T9	62	61	60	-	55	-	46	-	36	31	27
T10	63	62	61	58	54	50.5	47	-	38.5	-	28
T11	-	62.5	61	58	54	50.5	47	-	38.5	-	28
T12	64	62.5	60	58	54	50	48	44	38	-	-
T13	64	-	60	-	54	-	48	44	38	-	-

Tables 4-11, 4-22, 4-29, 4-41, 4-51, 4-62 and 4-71, printed pages 97 to 113. Hardness in HRC after a two hour temper.

Notes on the data

The composition figures are the GB/T 1298 ranges for the plain T grades. The A suffix controlled quality variants, T12A and T13A, share the same carbon range and the same heat treatment as the parent grade and are not listed separately. The hardening and tempering tables carry only the figures the source publishes for each grade, so a dash marks a temperature the source does not publish for that grade rather than a missing value. The multi-stage quench media named in the source, molten nitrate and caustic baths, are shown as a single hot bath route because the published hardness outcome is the same across that scheme group. A sub-zero treatment at minus 50 degrees Celsius is also published for T10, T11 and T12, held within one hour of quenching, and adds one to two HRC for dimensional stability on precision dies.

Aobo Steel, tool steel supplier

We supply forged and rolled tool steel from Huangshi, China, in D2, D3, O1, A2, H10, H11, H13, 420, 440C and related grades, in round bar and plate, annealed and ready to machine. Reference data for the grades and the heat treatment cycles of tool and die steels is collected for the buyers and process engineers who work with us. Source, Chinese mould and tool steel heat treatment handbook, Tables 4-1, 4-9 to 4-11, 4-20 to 4-22, 4-27 to 4-29, 4-38 to 4-41, 4-48 to 4-51, 4-60 to 4-62, 4-64 and 4-68 to 4-71, printed pages 92 to 113. Page, aobosteel.com/carbon-tool-steel-t7-t13-hardening-tempering/

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