

M3 Tool Steel Heat Treatment

The chemistry, the hardening cycle and the tempering response of M3 high speed steel in both classes, 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 M3 class 1 and class 2

Source, heat treating reference information for M3 class 1 and class 2, printed pages 190 and 191.

Grade	C	Mn	Si	Cr	Mo	V	W
M3-1	1.05	0.30	0.30	4.00	5.00	2.50	6.00
M3-2	1.20	0.80	0.55	4.00	5.00	3.00	6.00

The card prints one figure for each element rather than a specification range. Cobalt appears against both classes and sulfur against class 1 with no figure, so those rows are left out of the table rather than shown as a zero. One sulfur figure is printed, 0.27% on the class 2 card, which sits far above the sulfur level normally specified for high speed steel, so it is not carried into the table and is recorded here as the source prints it.

Hardening M3

Source, heat treating reference information for M3 class 1 and class 2, printed pages 190 and 191.

Step	M3-1	M3-2
Preheat	1500 °F (815 °C)	1500 °F (815 °C)
Harden	2250 °F (1230 °C)	2225 °F (1220 °C)
Quench	Oil or salt	Oil or salt

The card prints one preheat step with no size condition against it, so the step is not marked as one that only larger sections need. Both classes are given oil or salt as the quench medium, with no air alternative printed beside it.

Tempering response of M3

Source, heat treating reference information for M3 class 1 and class 2, printed pages 190 and 191.

Temper, °F	°C	M3-1, HRC	M3-2, HRC
As quenched	No temper	65	65
900	480	64	63
950	510	67	66
1000	540	67	66
1050	565	65	66
1100	595	61	65
1150	620	56	63
1200	650	52	60

The card steps the tempering temperatures by 50 °F from 900 °F to 1200 °F and prints one Rockwell C figure for each class on each row. The first row is the hardness as quenched, before any temper, and the rise on the two rows that follow it is secondary hardening.

Class 2 holds 60 HRC at 1200 °F (650 °C) where class 1 has fallen to 52 HRC, so the tool that runs hot has the vanadium and the upper tempering range on its side. Both classes leave the quench at 65 HRC and pass through a secondary hardening peak near 1000 °F (540 °C) before the line drops away.

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 M3 class 1 and class 2 come from the heat treating reference information on printed pages 190 and 191.

CONTACT

EMAIL
sales@aobosteel.com

WHATSAPP
+86 180 6294 5370

WEB
aobosteel.com



Scan for the full reference page