

## O6 Tool Steel Heat Treatment

The chemistry, the hardening cycle and the tempering response of graphitic O6 tool steel, 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 O6

Source, heat treating reference information for O6, printed page 194.

| Element    | Percent |
|------------|---------|
| Carbon     | 1.45    |
| Manganese  | 0.80    |
| Silicon    | 1.00    |
| Chromium   | 0.20    |
| Molybdenum | 0.25    |
| Graphite   | 0.45    |

The card prints one figure for each element rather than a specification range, and it lists graphite as its own row. Vanadium, 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 O6

Source, heat treating reference information for O6, printed page 194.

| Step    | O6                 |
|---------|--------------------|
| Preheat | 1200 °F (650 °C) * |
| Harden  | 1475 °F (800 °C)   |
| Quench  | Oil quench         |

The asterisk against the preheat is the card's own footnote, which reads "if used on larger mass parts", so the step is conditional on section size rather than printed for every load. The card prints one hardening temperature and one quench medium for the grade, with no air or salt alternative alongside the oil quench.

### Tempering response of O6

Source, heat treating reference information for O6, printed page 194.

| Temper, °F  | °C        | O6, HRC |
|-------------|-----------|---------|
| As quenched | No temper | 66      |
| 300         | 150       | 63      |
| 400         | 205       | 60      |
| 500         | 260       | 57      |
| 600         | 315       | 54      |

The card steps the tempering temperatures by 100 °F from 300 °F to 600 °F and prints one Rockwell C figure on each row. The first row is the hardness as quenched, before any temper. The 500 °F row follows the pattern of the rows above it, and the card carries no row at 700 °F or above.

Free graphite at 0.45% is the feature the grade is bought for, and it is why O6 machines more freely than the other oil-hardening grades at the same hardness. The card hardens the grade in oil from 1475 °F (800 °C), preheats at 1200 °F (650 °C) on larger mass parts, and the tempering line runs from 66 HRC as quenched down to 54 HRC at 600 °F (315 °C).

### Aobo Steel, tool steel supplier

Aobo Steel supplies tool steel to distributors and mold, tool and die shops, including D2, D3, O1, O2, O6, A2, S7, 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 O6 come from the heat treating reference information on printed page 194.

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