

# Cincinnati Tool Steel Company

Phone #: (815) 226-8800 (800) 435-0717 Fax #: (815) 226-4388

## AISI O6

### Graphiti Oil Hardening Tool Steel

O6 Graphitic is a medium alloy, 1.45 carbon, oil-hardening, tool steel. In the annealed conditions, about one-third of the carbon is present as graphitic carbon and the remainder as combined carbon in the form of carbides. In this condition, O6 is the most readily machinable of the oil-hardening tool steel grades.

Use O6 Graphitic for forming, shaping, and drawing dies, and for a great variety of cold-work dies calling for physical properties, wear resistance, and edge-holding similar to those of standard oil-hardening tool steels such as Type O1. Dies subject to galling and seizing can benefit from the non-galling, self-lubricating characteristics of O6 Graphitic.

**Machinability** - If properly annealed to Brinell 212 max, O6 has a machinability rating of 125, as compared with a 1 pct carbon tool steel, rated at 100.

**Dimensional Stability** - When oil quenched from the proper hardening temperature this grade normally exhibits an expansion of 0.001 5 in/in. plus.

### Typical Analysis

Carbon	1.45	Manganese	0.80
Silicon	1.15	Molybdenum	0.25

### Annealing

Heat uniformly to a temperature range of 1425 to 1450°F. Then cool slowly in the furnace to 1000°F and hold at this temperature approximately one hour per inch of greatest cross-section. Cool in air. The resulting hardness will be Brinell 217 max.

### Hardening

Preheat thoroughly at approximately 1250°F, and then heat to the hardening temperature of 1450 to 1500°F. For small sections, the lower part of the hardening range should be used; larger sections require the higher temperatures. All sections should be equalized at the hardening temperature for one hour per inch of greatest cross-section before quenching in oil to 150°F. Temper immediately.

## Tempering

For the majority of tooling work, tempering at 300 to 400°F is satisfactory. This will result in a hardness of approximately Rockwell C 61/62. Heat the tools to the tempering temperature and hold for approximately two hours per inch of greatest cross-section.

Heat-treatment, consisting of oil quenching 1-in.diameter round specimens from 1475°F and tempering at various temperatures, has produced the following results:

<u>Temperature - °F</u>	<u>Rockwell C</u>
As Quenched	65
300	62
400	61
500	60
600	58
700	54

---

Data shown are typical, and should not be construed as maximum or minimum values for specification or for final design.  
Data on any particular piece of material may vary from those herein.