4140 HT – Technical Data

General Descriptions:

4140 HT is a medium carbon alloy steel heat treated to a nominal hardness of 28-32 HRC.
4140 HT can also be surface hardened to increase wear resistance.
4140 TFHT flats are readily available, and can be surface ground to tool steel tolerances.

Examples of applications:

Stripper support plates, punch holders, clamps, short run dies, brake dies, fixtures, wear parts, die runners, base plates, molds, jigs and tool holders.

Chemical Composition

Carbon	Silicon	Molybdenum	Manganese	Chromium
0.40-0.45%	0.25-0.35%	0.15-0.25%	0.80-1.10%	0.90-1.10%

Surface Treatment

4140 HT can be surface hardened using any of the diffusion nitridingprocesses such as ion, gas, or salt bath.

Heat Treatment Response

Tempering Temp °F	Hardenening Temp / HRC 1500 °F
As Quenched	53-57
400	52
600	50
800	45
1000	36-37

Physical Properties

Modulus of Elasticity	29 x 10^6 psi (200 GPa)	**Density**	0.282 lb/in^3
Annealed Hardness	185-200 BHN	**Machinability**	70-75% of O1

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Heat Treatment

Annealing

1550 ºF, hold 2 hours, slow cool (50 ºF/Hr max) to 1200 ºF, then air or furnace cool.
Annealed hardness is 185-200 BHN.

Stress Relieving

Annealed Material: 1100-1300 ºF, hold 2 hours, air cool.
Hardened Material: 50-100 ºF below last tempering temperature, hold 2 hours at temperature, then air cool to room temperature.

Hardening

Preheat to 1250-1300 ºF. Equalize.

High Heat (Austenitizing)

1550-1600 ºF. Soak for 10-30 minutes per inch of thickness at recommended temperature.
For vacuum hardening, use the high side of the hardening range and use longer soak times.

Quench

Oil quench to room temperature. Temper immediately.
Note: Vacuum furnaces must have oil quench capability to achieve comparable results.

Tempering

Temper at 400-1200 ºF for 1 hour per inch of thickness at temperature is recommended, 2 hour minimum.
Air cool to room temperature.