DATA SHEET

LATROBE SPECIALTY STEEL COMPANY
Latrobe, PA 15650-0031 USA

Issue 1

LSS™ L6 Tool Steel

(ASTM L6)

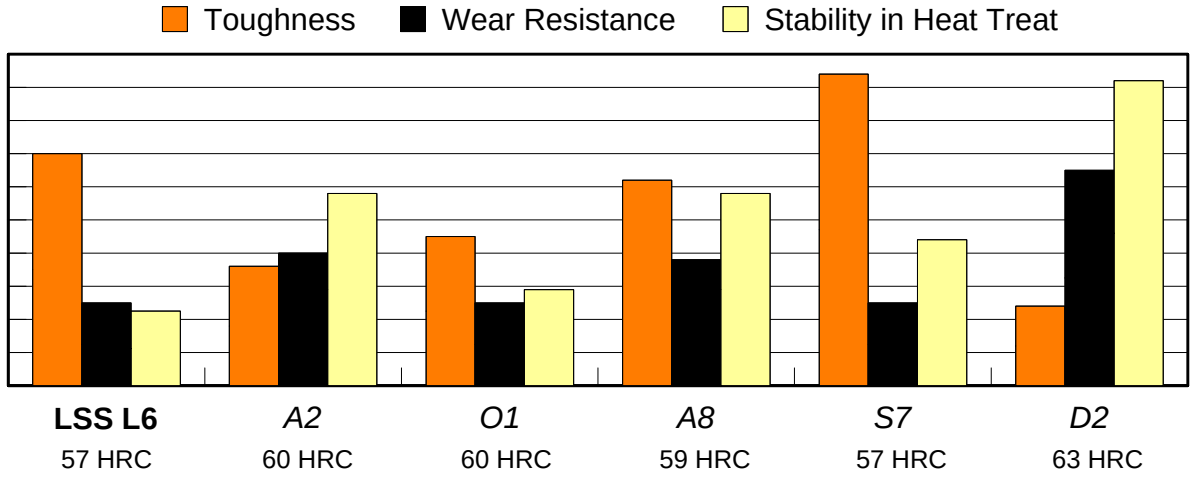
Typical Composition

C	Mn	Si	Cr	Ni
0.70	0.60	0.25	0.70	1.40

LSS L6 tool steel is a versatile, oil-hardening tool steel that is characterized by very good toughness. LSS L6 tool steel is suitable for use as tools, dies, and machine parts, which require a good combination of hardness and toughness. The relatively high nickel content results in an alloy with greater impact toughness compared to the other common oil-hardening grades.

Typical applications for LSS L6 tool steel include punches and dies, cold forming tools, and coining dies.

Relative Properties



Physical Properties

Density: 0.284 lb/in^3 (7861 kg/m^3)
Specific Gravity: 7.86
Modulus of Elasticity: 30x106 psi (207 GPa)
Thermal Conductivity: 20 BTU/hr/ft/°F (34.5 W/m/°K)

Machinability: 75% of a 1% carbon steel

Coefficient of Thermal Expansion: (at 55-57HRC)

Temperature, °F	in/in °Fx10^{-6}	Temperature, °C	mm/mm °Cx10^{-6}
70 - 200	6.25	21 - 93	11.24
70 - 300	6.57	21 - 149	11.81
70 - 400	7.01	21 - 204	12.60
70 - 500	7.25	21 - 260	13.03
70 - 600	7.35	21 - 316	13.21
70 - 700	7.50	21 - 371	13.48
70 - 800	7.68	21 - 427	13.81
70 - 900	7.74	21 - 482	13.91
70 - 1000	7.99	21 - 538	14.36

LSS™ L6
HEAT TREATING INSTRUCTIONS

(See Tech-Topics Bulletin 102 for a more thorough explanation of heat treating.)

HARDENING:

Critical Temperature:
Ac1: 1325°F (719°C)

Preheating: Heat at a rate not exceeding 400°F per hour (222°C per hour) to 1150-1250°F (621-677°C) and equalize.

Austenitizing (High Heat): Heat slowly from the preheat.

Furnace or Salt: 1450-1500°F (788-816C)

Soak for 30 minutes for the first inch (25.4 mm) of thickness, plus 15 minutes for each additional inch (25.4 mm).

Quenching: Oil to 150-125°F (66-51°C).

Note: Sizes under 3 inches (76.2mm) in cross section will achieve moderate hardness by cooling in a blast of air or pressurized gas.

Tempering: *Temper immediately after quenching*. Hold at temperature for 1 hour per inch (25.4 mm) of thickness, 4 hours minimum, then air cool to ambient temperature.

To minimize internal stresses in cross sections greater than 6 inches (152.4 mm) and to improve stability in tools that will be EDM'd after heat treatment, a soaking time of 8 to 10 hours at the tempering temperature is strongly recommended.

Cryogenic Treatment: Some prefer to do cryogenic treatment as an extension of the quench from the austenitizing treatment. Others prefer to cryogenically treat after tempering.

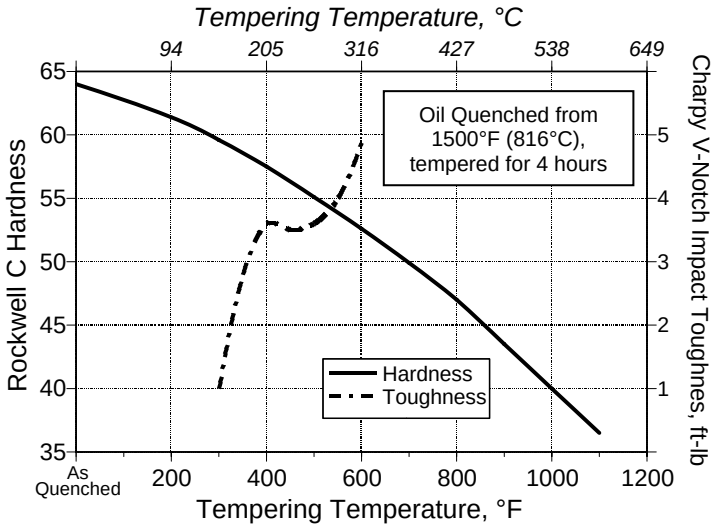
ANNEALING: Annealing must be performed after hot working and before rehardening.

Heat at a rate not exceeding 400°F per hour (222°C per hour) to 1400°F (760°C), and hold at temperature for 1 hour per inch (25.4mm) of maximum thickness; 2 hours minimum. Then cool slowly with the furnace at a rate not exceeding 50°F per hour (28°C per hour) to 1000°F (538°C). Continue cooling to ambient temperature in the furnace or in air. The resultant hardness should be a maximum of 235 HBW.

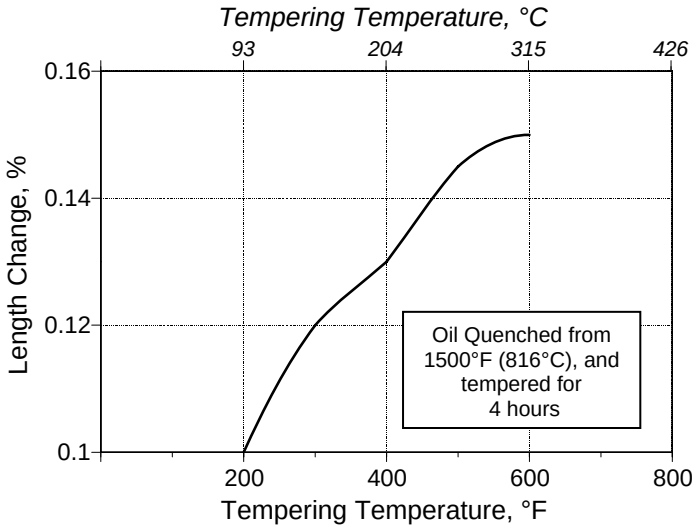
For improved machinability, hold at 1400°F (760°C) for 1 hour per inch (25.4mm) of maximum thickness; 2 hours minimum. Then cool slowly with the furnace cool from 1400°F (760°C) to 1250°F (677°C), hold for 8 hours, then air cool to ambient temperature. The resultant hardness should be a maximum of 192 HBW.

HEAT TREATMENT RESPONSE

As Air Cooled from	HRC
1400°F (760°C), 30 minutes	62
1450°F (788°C), 30 minutes	63.5
1500°F (816°C), 30 minutes	64
1550°F (843°C), 30 minutes	63.5



Size Change During Hardening



LATROBE SPECIALTY STEEL COMPANY

The data presented herein are typical values, and do not warrant suitability for any specific application or use of this material. Normal variations in the chemical composition, the size of the product, and heat treatment parameters may result in different values for the various physical and mechanical properties.

Latrobe, PA Phone: 724-537-7711
FAX: 724-532-6316
WEB: www.latrobesteel.com

Vienna, OH Phone: 800-321-6446
FAX: 330-609-2054

Marlborough, MA Phone: 800-444-4447
FAX: 508-481-6581