



## LSS™ Chipper Knife Tool Steel (ASTM A8 Modified)

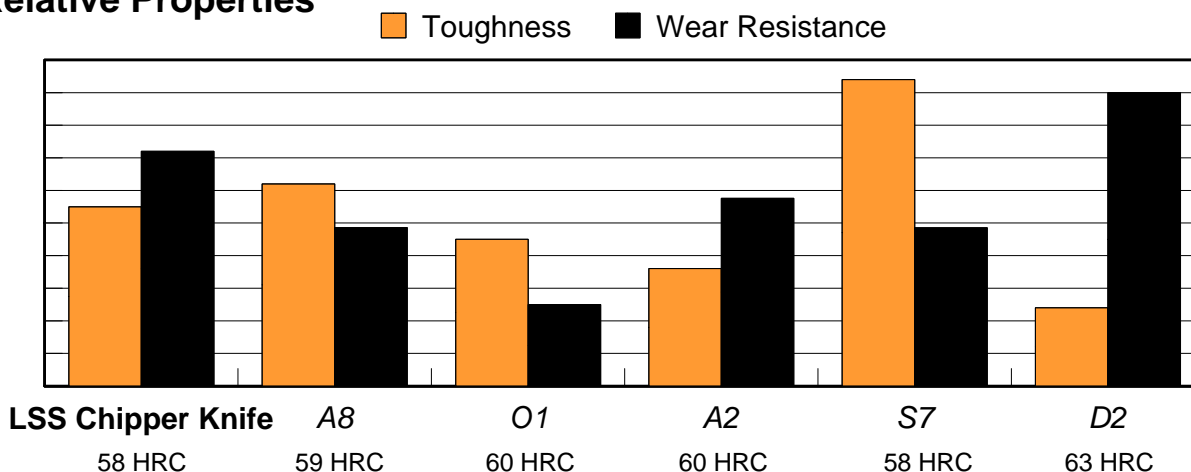
### Typical Composition

C	Mn	Si	Cr	Mo	V
0.50	0.45	0.95	8.00	1.30	0.45

**LSS Chipper Knife** tool steel is an air-hardening, 8% chromium tool steel that exhibits very good wear resistance and toughness. LSS Chipper Knife exhibits wear resistance that is better than that of S7, and toughness that is better than that of D2.

Typical applications include wood chipper knives, slitter knives, scrap shears, plastic granulator knives, tire shredding knives, shear blades, planer knives, punches, and fine-blanking dies.

### Relative Properties



### Physical Properties

Density: 0.279 lb/in<sup>3</sup> (7750 kg/m<sup>3</sup>)  
 Specific Gravity: 7.75  
 Modulus of Elasticity: 29 x10<sup>6</sup> psi (200 GPa)

Machinability: 70-75% of a 1% carbon steel

### Thermal Conductivity

Temperature °F	Btu/hr-ft-°F	Temperature °C	W/m-°C
68	15.1	20	26.1
392	15.7	200	27.1
752	16.5	400	28.6

### Coefficient of Thermal Expansion:

Temperature °F	in/in/°F x 10 <sup>-6</sup>	Temperature °C	mm/mm/°C x 10 <sup>-6</sup>
68 - 392	6.5	20 - 200	11.6
68 - 752	6.3	20 - 400	11.3

## LSS™ Chipper Knife HEAT TREATING INSTRUCTIONS

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

### HARDENING:

**Preheating:** Heat to 1200-1250°F (649-677°C) and equalize.

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

Furnace or Salt: 1850-1925°F (1010-1052°C)

For maximum wear resistance, austenitize at 1925°F (1052°C).

For maximum toughness, austenitize at 1850°F (1010°C).

For the optimum combination of wear resistance and toughness, austenitize at 1900°F (1038°C).

**Quenching:** Air, pressurized gas, or interrupted oil to 150-125°F (66-51°C).

For oil, quench until black, about 900°F (482°C), then cool in still air to 150-125°F (66-51°C).

**Tempering:** Temper immediately after quenching. Hold at temperature for 1 hour per inch (25.4 mm) of thickness, 2 hours minimum, then air cool to ambient temperature. Double tempering is recommended for tempering temperatures of 900°F (482°C) and higher.

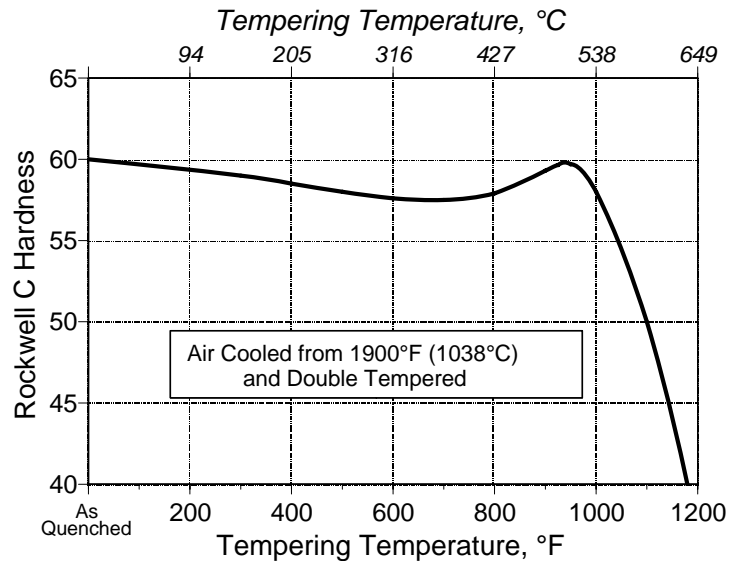
**Cryogenic Treatment:** Some prefer to do cryogenic treatment as an extension of the quench from the austenitizing treatment. Others prefer to cryogenically treat after tempering.

**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 1625°F (885°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 20°F per hour (11°C per hour) to 1200°F (649°C). Continue cooling to ambient temperature in the furnace or in air. The resultant hardness should be a maximum of 229 HBW.

## HEAT TREATMENT RESPONSE

As Air Cooled from	HRC
1850°F (1010°C), 30 minutes	59
1900°F (1038°C), 30 minutes	60
1925°F (1052°C), 20 minutes	61



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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.