



## Whitebear™ Cold Work Tool Steel (A18)

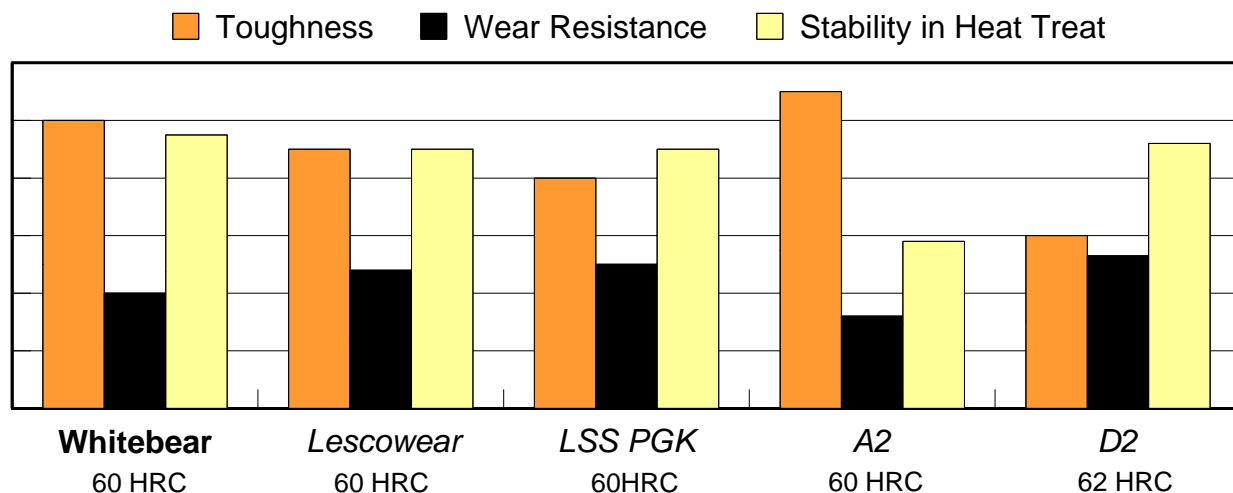
### Typical Composition

C	Mn	Si	Cr	Mo	V
0.83	0.35	1.00	7.75	1.55	2.15

**Whitebear cold work tool steel** is a versatile air-hardening tool steel in the 8% chromium family that is characterized by a very good combination of toughness and wear resistance. It contains lower carbon and total alloy content than most of the other cold work tool steels in the 8% chromium family, and these differences enhance the impact toughness of the steel at some sacrifice in wear resistance.

Typical applications for Whitebear cold work tool steel include punches, blanking dies, thread roll dies, coining dies, drawing dies, upsetting dies, and rolls.

### Relative Properties



### Physical Properties

Density: 0.282 lb/in<sup>3</sup> (7805 kg/m<sup>3</sup>)  
Specific Gravity: 7.81  
Modulus of Elasticity: 30x10<sup>6</sup> psi (207 GPa)

Machinability: 65-70% of a 1% carbon steel

# Whitebear™

## HEAT TREATING INSTRUCTIONS

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

### HARDENING:

**Preheating:** To minimize distortion and stresses in large or complex tools use a double preheat. Heat at a rate not exceeding 400°F per hour (222°C per hour) to 1150-1250°F (621-677°C) equalize, then heat to 1500-1550°F (816-843°C). For normal tools, use only the second temperature range as a single preheating treatment.

**Austenitizing (High Heat):** Heat rapidly from the preheat to: 1900-2000°F (1038-1093°C).

Equalize and soak at the austenitizing temperature for 30 minutes for pieces up to 1 inch (25.4 mm) in thickness, plus 15 minutes for each additional inch (25.4 mm) of thickness.

For maximum toughness, austenitize at the low end of the recommended range. For maximum wear resistance, austenitize at the upper end of the recommended range.

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

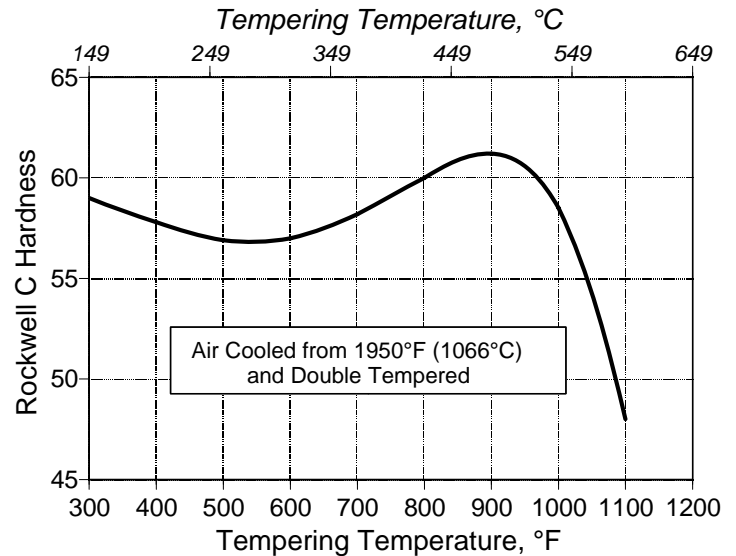
**Tempering:** *Temper immediately after quenching.* Hold at temperature for 1 hour per inch (25.4 mm) of thickness, 2 hours minimum, then air cool to ambient temperature. Typical tempering temperatures are 950 to 1100°F (510 to 593°C). Double tempering is required.

**Cryogenic Treatment:** Refrigeration treatments should typically be performed after the first temper, and must be followed by a second temper.

**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 1550-1650°F (843-899°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 25°F per hour (11°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 241 HBW.

## HEAT TREATMENT RESPONSE



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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.