

## GATEWAY CPM 9V

### Powder Metal Tool Steel

**Gateway CPM 9V** is an air-hardening, powder metal tool steel that provides very Tool Steel high wear resistance in combination with high impact toughness. A large volume of hard vanadium carbides provides the high wear resistance. CPM 9V contains less carbon and vanadium than CPM 10V, which results in a lower obtainable hardness, slightly lower wear resistance, but a significant increase in toughness. The lower carbon content also enables CPM 9V to be used in warm and hot work applications where resistance to thermal fatigue is important.

### Typical Chemistry

Carbon	1.80		Chromium	5.25
Manganese	.50		Vanadium	9.00
Silicon	.90		Molybdenum	1.35

### Applications

CPM 9V may be used in unique tooling applications for improved toughness compared to CPM 10V and high speed steels, and improved wear resistance compared to Gateway D2 and other tool steels. Duratech Nine is widely used for plastic injection feed screws, non-return valves, shear blades, and forging dies.

### Annealing

Annealing must be performed after hot working and before rehardening. Heat at a rate not exceeding 400 F per hour to 1600-1650 F, and hold at temperature for 1 hour per inch of maximum thickness; 2 hours minimum. Then cool slowly with the furnace at a rate not exceeding 50 F per hour to 1000 F. Continue cooling to ambient temperature in the furnace or in air.

### Heat Treating

Preheat to 1500/1550 F, equalize. Heat rapidly to the high heat from the preheat.

<b>For optimum wear resistance</b>	1. Soak 5 to 15 minutes
	2. Furnace or Salt Bath : 2150 F
<b>For balance of wear &amp; toughness</b>	1. Soak 15 to 30 minutes
	2. Furnace or Salt Bath : 2000 F
<b>For maximum toughness &amp; minimum distortion</b>	1. Soak 30 to 60 minutes
	2. Furnace : 1900 F
	3. Salt Bath : 1875 F

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### **Heat Treating (continued)**

Quenching: Pressurized gas, warm oil, or salt. Sections less than 2-1/2" thick may be air cooled to maximum hardness. Sections 2-1/2" thick or more must be quenched at a faster rate, using one of the methods below, to obtain maximum hardness. For pressurized gas, the furnace should have a minimum quench pressure of 4 bars. The quench rate below 1000 F is critical to obtain the desired properties. For oil, quench until black, about 900 F, then cool in still air to 150/125 F. For salt maintained at 1000/1100 F equalize in the salt, then cool in still air to 150/125 F.

### **Tempering**

Temper immediately after quenching. Typical temperature range is 1000/1100 F. Do not temper below 1000 F. Hold at temperature for 2 hours then air cool to ambient temperature. Double tempering is required. Triple tempering is required when austenitized at 2050 F or higher.

Note: See your Gateway Metals representative to obtain specific heat treatment information to obtain certain hardness readings for your specific application. 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.

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