Gateway Metals Inc.

DATA SHEET

GATEWAY CPM M4

Powder Metal High Speed Tool Steel

Gateway CPM M4 high speed steel is an extremely versatile high speed steel which High Speed provides a unique combination of high wear resistance with high impact toughness and Tool Steel transverse bend strength. A large volume of vanadium carbides provides the high wear resistance. The high impact toughness and high transverse bend strength are the results of the fine grain size, small carbides, and superior cleanliness of the powder metallurgy (PM) microstructure.

Typical Chemistry

Carbon	1.45		Chromium	4.50
Manganese	.25		Vanadium	3.85
Silicon	.25		Molybdenum	4.50
Sulfur	.008		Tungsten	5.50

Applications

CPM M4 is suitable in high speed applications providing improved cutting tool life compared to conventionally wrought M1, M2, and M7, and in cold work applications where it provides better toughness and wear resistance than high-carbon, high-chromium die steels as D2 and D3.

Annealing

Annealing must be performed after hot working and before rehardening. Heat at a rate not exceeding 400 F per hour to 1575-1600 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. A second reheat at 1850/1900 F is recommended for vacuum hardening. Heat rapidly to the high heat from the preheat.

For Cutting Tools	1. Soak 5 to 15 minutes
	2. Furnace : 2150/2200 F
	3. Salt Bath : 2125/2175 F
For Cold Work Tooling	1. Soak 25 to 45 minutes
	2. Furnace : 1875/2125 F
	3. Salt Bath : 1850/2100 F

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Heat Treating (continued)

Quenching: Pressurized gas, warm oil, or salt. For pressurized gas quenching, the quench rate to 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 2100 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.