NIAGARA SPECIALTY METALS

DATA SHEET

CPM® 4V

Typical Composition

C	Mn	Si	Cr	Mo	V
1.35	0.40	0.80	5.00	2.95	3.85

CPM® 4V is a powder tool steel designed as an upgrade for CPM® 3V for the blanking and advanced high strength steel applications. The goal was to design an alloy with high impact toughness and more wear resistance than currently available with CPM® 3V. Knife makers have often regarded CPM® 3V as a great heavy duty knife material and CPM® 4V will be an improvement for those who need more wear resistance. Intended to be used at HRC 62–64. CPM® 4V should be used in CPM® 3V applications that require more wear resistance.

Typical Applications: Powder compaction tooling, fine blanking tools, stamping or forming tools, and advanced high strength steel applications.

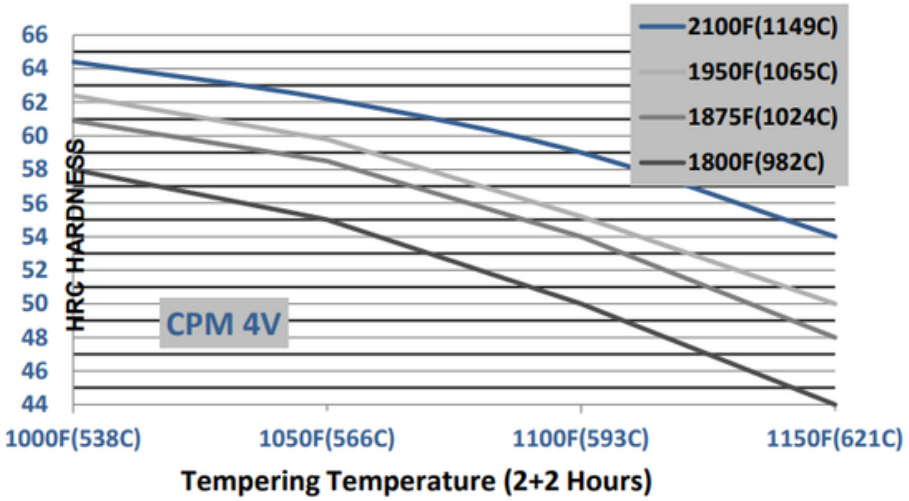
Mechanical Properties

Impact Toughness

The CPM® microstructure gives CPM® 4V its high impact toughness which approaches that of the shock resistant tool steels.

Relative Mechanical Properties

The combination of wear resistance and toughness of CPM® 4V makes it an excellent alternative to some other tool steel due to its high impact toughness and high range of wear resistance.



This data sheet is for informational purposes only. Alloy characteristics are subject to change due to chemical composition and/or processing. We do not certify the material's suitability for specific applications.

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Thermal Treatments
Hardening Preheat: Heat to 1500–1550°F (816–845°C), equalize.
Austenitize: Following preheat heat material rapidly.
Quench: Air or positive pressure quench (4 bar minimum), or oil quench (black) to about 900°F (482°C), then air cool to 150°F – 125°F (66°C – 51°C). Salt bath treatment, if practical, will ensure the maximum attainable toughness for a given hardening treatment. Salt quench at 1000°F–1100°F (538°C–593°C), equalize, then air cool to 150°F–125°F (66°C–51°C).
Temper: Immediately after quenching, temper three times (two times minimum) at 1000–1100°F (538–593°C). Hold at temperature for 1 hour per inch of thickness, 2 hours minimum, then air cool. Do not temper below 1000°F (538°C).

Recommended Heat Treatment: For the best combination of toughness and wear resistance, austenitize (furnace or salt bath) at 1875–1950°F (1024–1065°C), soak 30 minutes, and quench. Temper 3 times at 1000°F (538°C). For maximum wear resistance austenitize (furnace or salt bath) at 2100°F (1149°C), soak 15 minutes, and quench. For maximum toughness austenitize (furnace or salt bath) at 1800°F (982°C), soak 30 minutes, and quench.
Aim hardness: HRC 62–64. Higher austenitizing temperatures can be used to obtain higher hardness, at a slight decrease in impact resistance. The lower austenitizing temperatures provide the best impact toughness.

Annealing
Annealing must be performed after hot working and before rehardening. Heat at a rate no higher than 400°F (222°C) per hour to 1600–1650°F (871–899°C). Hold at temperature for 1 hour per inch of thickness, 2 hours minimum. Cool slowly with the furnace at a rate no higher than 50°F (28°C) to 1000°F (649°C), until cooled to ambient temperature, in the furnace or in air.

Heat Treat Response – HRC Hardness				
	Austenitizing Temperature			
Tempering Temp	1800°F (982°C)	1875°F (1024°C)	1950°F (1065°C)	2100°F (1149°C)
Minimum Time	30 Min	30 Min	30 Min	15 Min
1000°F (540°C)	58	61	62.5	64.5
1050°F (565°C)	55	58.5	59.5	63
1100°F (593°C)	50	54	55.5	59
1150°F (621°C)	44	48	50	54
Minimum Tempers	2	2	2	2