CPM 3V – Technical Data

General Descriptions:

CPM 3V is made by the particle metallurgy process and is designed to provide maximum resistance to breakage and chipping in a highly wear-resistant tool steel. CPM 3V offers impact toughness greater than A2, D2, Cru-wear or PM M4, approaching the levels of S7 and other shock resistant grades, yet it provides excellent wear resistance, high hardness and thermal stability for coatings. Intended to be used at 58-60 HRC, CPM 3V can replace high alloy tool steels in wear applications in which chronic tool breakage and/or chipping problems are encountered.

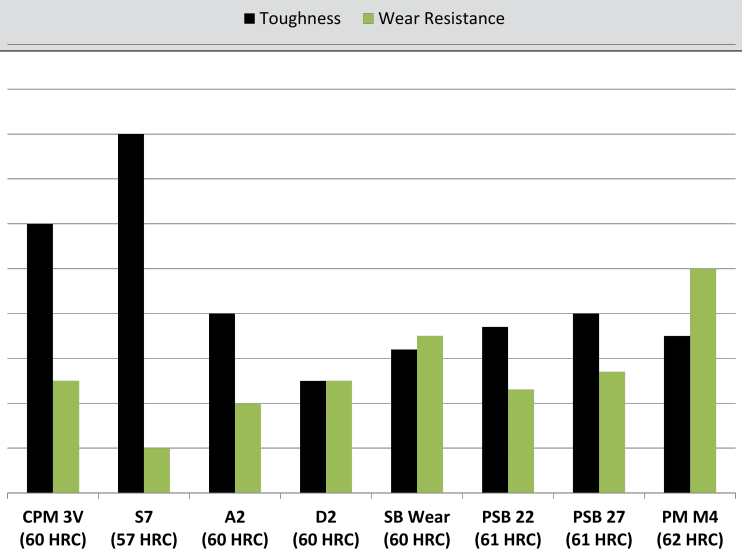
Examples of applications:

Stamping or forming tools, powder compaction tooling, industrial knives and slitters, fineblanking tools, cold heading tooling, plastic injection feeder screws and tips, punches and dies, blanking dies, shear blades, scrap choppers and rolls.

Chemical Composition

Carbon	Molybdenum	Vanadium	Chromium
0.80%	1.30%	2.75%	7.5%

Comparison Chart



Typical Heat Treat Response

Tempering Temp °F	Hardness HRC 1875 °F	1950 °F	2050 °F	Toughness, Charpy C-Notch Ft.-lbs
As quenched	58	62	63	
1000	56	59	61	1875 °F = 85 Ft-Lb
1025	54	57	60	1950 °F = 70 Ft-Lb
1050	51	54	57	2050 °F = 40 FT-Lb

Size Changes During Hardening

Hardening Temp °F	Tempering Temp	HRC	Longitudinal Size Change %
1875	1000	56	+0.10%

Surface Treatment

Because of its high tempering temperatures CPM 3V is suitable for nitriding, PVD coating or similar surface treatments. CVD coating processes generally exceed the critical temperature and may result in non-predictable dimensional changes.

CPM 3V – Technical Data

Heat Treatment

Annealing

Heat to 1650 °F, hold 2 hours, slow cool (25 °F /hour max) to 1100 °F, then furnace cool or cool in still air to room temperature.
Annealing hardness is approximately BHN 241

Stress Relieving

Annealed Parts: Heat to 1100-1300 °F, hold 2 hours, then furnace cool or cool in still air.

Hardened Parts: Heat to 25-50 °F below tempering temperature, hold 2 hours, then furnace cool or cool in still air.

Hardening

Preheat to 1500-1550 °F. Equalize.

High Heat (Austenitizing)

1875-2050 °F, holding time at temperature is 20-45 minutes.

Quench

Air or positive pressure quench (2 bar minimum) to below 125 °F.

Tempering

Temper three times at 1000-1050 °F, 2 hours holding time per temper. Cool to room temperature between tempers.

Physical Properties

Modules of Elasticity	30 x 10^6 psi (207 GPa)	**Density**	0.28 lb/in^3
Annealed Hardness	BHN 241	**Machinability**	75% of O1