



SB Specialty Metals LLC

Your *First Choice* for Specialty Metals

PD #1 – Technical Data

General Descriptions:

PD #1 is a high toughness wear-resistant tool steel made made with the Particle Metallurgy process. It is designed to provide maximum resistance to breakage and chipping in a high wear-resistance steel. It offers impact resistance greater than A2, D2, SB Wear and PMM4, approaching the levels provided by S7. PD #1 is intended to be used at 60/62 HRC in application where chronic breakage and chipping are encountered in other tool steels, but where the wear properties of a high alloy steel are required.

Example of applications:

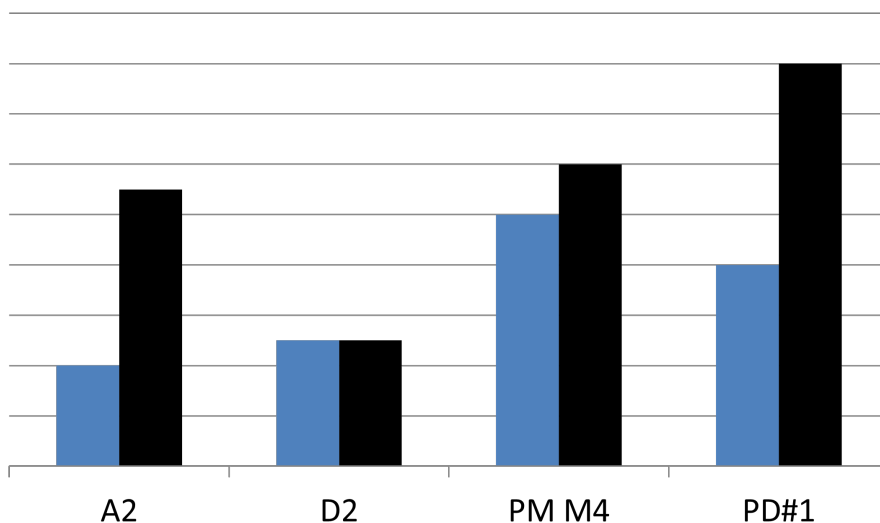
Stamping or forming tools, punches and dies, blanking tools, fine blanking tools, industrial knives and slitters, shear blades, scrap choppers, rolls, plastic injection and extrusion feedscrews.

Chemical Composition

Carbon	Manganese	Molybdenum	Vanadium	Chromium	Tungsten	Silicon
1.00-1.15%	0.20-0.30%	1.50-1.70%	2.20-2.40%	7.50-7.80%	1.00-1.20%	1.00-1.30%

Comparison Chart

■ Wear Resistance ■ Toughness



Typical Heat Treat Response

Tempering Temp °F	Austenitizing Temperature			
	1850 °F	1950 °F	2000 °F	2050 °F
900	60.5	62	63	61
950	50	64	65	65
1000	58	61	63	64
1050	52	55	59	60
1100	45	48	51	53

Size Changes During Hardening

Hardening Temp °F	Tempering Temp	HRC	Longitudinal Size Change %
1950	950	64	+0.09%
1950	1050	55	+0.10%

Surface Treatment

Because of PD #1's higher tempering temperatures, it may be treated by most surface treating processes, including ion nitriding, titanium nitride coating, and other treatments.



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Heat Treatment

Annealing

Heat to 1600 °F, hold 2 hours at temperature, slow cool (30 °F /hour max) in the furnace to 1000 °F, then cool to room temperature.
Annealed hardness is 225-250 BHN.

Stress Relieving

Annealed/rough machines parts: Heat to 1200-1250 °F, hold 2 hours at temperature, then cool in still air.
Hardened parts: Heat to 25-50 °F below final tempering temperature, hold 2 hours, then cool to room temperature.

Hardening

Preheat: 1550-1600 °F

High Heat (Austenitizing)

1850-2050 °F, hold at temperature for 45 minutes.

Quench

Air or positive pressure quench, two bar minimum. Temper immediately after quench.

Tempering

Triple tempering at two hours per temper is highly recommended.
Tools must be cooled to room temperature between tempers.

Physical Properties

Modules of Elasticity	30 psi x 10 ⁶ (207GPa)	Density	0.277 lbs/in ³
Annealed Hardness	225-250 BHN approximately.	Machinability	65% of O1