

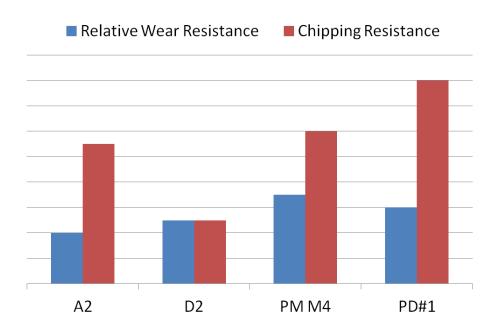
Technical Information: Micro-Melt® PD#1

PD#1 IS A COLD WORK TOOL STEEL PRODUCED USING
THE MICRO-MELT® (POWDERED METAL) STEEL MAKING PROCESS.
THE GRADE HAS EXCELLENT WEAR RESISTANCE AND TOUGHNESS
COMBINED WITH MODERATE HARDNESS

PD#1 IS IDEAL FOR COLD WORK APPLICATIONS NEEDING A HIGH DEGREE OF TOUGHNESS

TYPICAL CHEMICAL COMPOSITION				
CARBON	1.10%	Снкомим	7.75%	
MOLYBDENUM	1.60%	SILICON	1.20%	
VANADIUM	2.35%	Manganese	O.25 %	
Sulfur	0.03%			

SBSM PM Steel Properties Comparison



PHYSICAL PROPERTIES

MODULUS OF ELASTICITY	.30 PSI X 10°(207 GPA)
DENSITY	0.277 LB/IN ³
Annealed Hardness	.225-255 Brinell Hardness (BHN)
MACHINABILITY	SIMILAR TO M4 HIGH SPEED STEEL

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HEAT TREATMENT

ANNEALING

HEAT TO 1600°F, HOLD TWO HOURS

SLOW COOL 20°F/HOUR TO 600°F

THEN AIR OR FURNACE COOL TO ROOM TEMPERATURE

STRESS RELIEVING

Performed prior or after machining to minimize distortion in heat treating 1100/1200°F, hold two hours

Then air cool to room temperature

HARDENING

SALT BATH, PROTECTIVE ATMOSPHERE, OR VACUUM FURNACE EQUIPMENT PREFERRED.

HIGH HEAT (AUSTENITIZING)

1950/2050°F FOR 20 TO 30 MINUTES AT HEAT.

HIGHER AUSTENITIZING TEMPERATURES REQUIRE LESS TIME AT HEAT

QUENCH

SALT BATH QUENCH TO 1000-1100°F, EQUALIZE, THEN AIR COOL TO 150°F.

VACUUM OR ATMOSPHERE QUENCH RATE OF A MINIMUM 50 DEGREES F PER MINUTE DOWN TO 1200F IS

CRITICAL TO ACHIEVE BEST HEAT TREAT RESPONSE.

TEMPER IMMEDIATELY FOLLOWING QUENCH

TEMPERING

MINIMUM 950°F TEMPERING TEMPERATURE REQUIRED.

DOUBLE TEMPERING IS REQUIRED, TRIPLE TEMPERING RECOMMENDED.

AIR COOL TO ROOM TEMPERATURE BETWEEN TEMPERS.

TYPICAL HEAT TREAT RESPONSE

°F	1950°F	2050°F
As QUENCHED	62	61
950	63	64.5
1000	60.5	64
1050	55	59.5
1100	47.5	52.5

LONGITUDINAL SIZE CHANGE

APPROXIMATELY: PLUS 0.10%