



PSB38 – Technical Data

General Descriptions:

PSB38 is a premium spray formed High Speed Steel. It is ideal for many high speed applications providing improved toughness and higher wear resistance than conventional M2. The spray form process imparts a more homogeneous structure with improved carbide distribution and a preferred spherical carbide shape.

Example of applications:

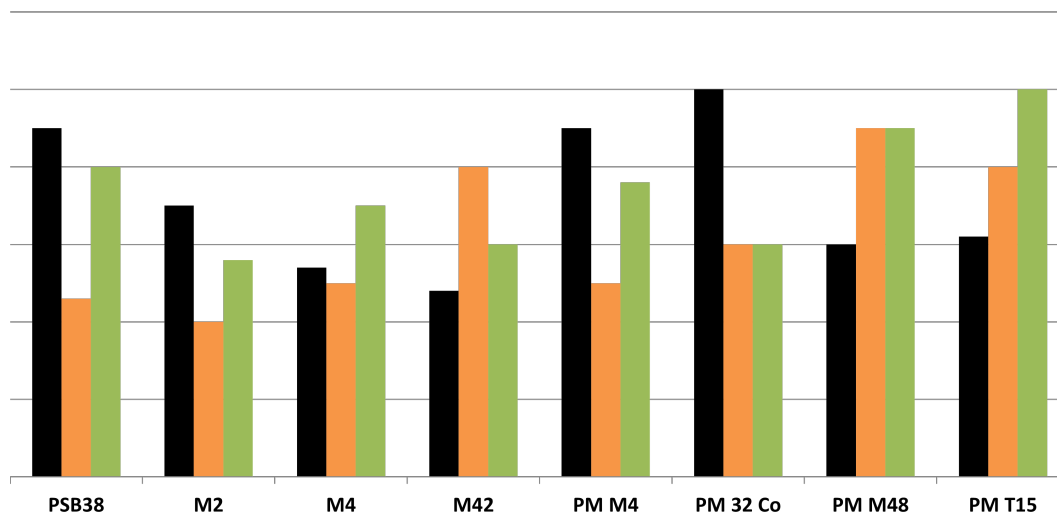
Drills, end mills, tool bits, broaches, milling cutters, form tools, taps and punches. PSB38 can also be used in numerous cold work applications as well as certain hot work applications.

Chemical Composition

Carbon	Molybdenum	Tungsten	Vanadium	Chromium	Silicon	Manganese
0.78%-0.88%	4.50% - 5.50%	5.50%-6.75%	1.75% - 2.20%	3.75% - 4.50%	0.20%-0.45%	0.15%-0.40%

Comparison Chart

■ Toughness ■ Red Hardness ■ Wear Resistance



Typical Heat Treat Response

Tempering Temp °F	Hardness (HRC)		
	2100°F	2150°F	2250°F
975	65	66	66-67
1000	65	66	67
1025	64	65-66	67-68
1050	63	65	67
1075	62	64	65
1100	61	63	64
1125	60	61	63
1150	58	59	61

Size Changes During Hardening

Hardening Temp °F	Tempering Temp	HRC	Longitudinal Size Change %
2150	1025	65	+0.20

Surface Treatment

PSB38 can be nitrided, or titanium-nitride coated. If it is titanium-nitride coated, care is required in vacuum hardening.



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Heat Treatment

Forging

Critical temperature - 1530 °F.
Forging temperature - 2075 °F. Slow cool after forging. Do not forge below 1700 °F.

Annealing

Heat to 1600 °F and hold for two hours at temperature.
Slow cool 25 °F per hour to 1000 °F, then air or furnace cool to room temperature.
Resulting hardness - Brinell 220/260.

Stress Relieving

Performed after rough machining to minimize distortion in heat treatment.
1200 °F, hold for two hours at temperature, then air cool to room temperature.

Hardening

Salt bath or vacuum furnace preferred.

High Heat (Austenitizing)

Preheat-1500/1550 °F - let parts equalize. 2100/2225 °F - soak for 5-10 minutes. For vacuum hardening, use the high side of the austenitizing range and use longer soak time.

Quench

Salt bath quench to 1000/1100 °F, equalize, then air cool to 150 °F. Temper immediately following the quench.
Vacuum quench at a minimum of 50 °F per minute down to below 1000 °F, then cool to room temperature.

Tempering

Minimum of 1000 °F tempering temperature required.
Double tempering is required, triple tempering is recommended.
Air cool to room temperature between tempers.

Physical Properties

Modulus of Elasticity	30 psi x 10 ⁶ ... (207 GPa)	Density	0.294 lb/in ³
Annealed Hardness	220-260 Brinell hardness (BHN)	Machinability	60% of O1