



# SB Specialty Metals LLC

Your **First Choice** for Specialty Metals

## PMT15 – Technical Data

### General Descriptions:

PM T15 is a super high speed steel made by the particle metallurgy (PM) steel making process. It is a tungsten type high speed steel containing high vanadium for excellent abrasion resistance and cobalt for good red hardness.

PM T15 is ideal for cutting difficult to machine material where high frictional heating is encountered.

### Examples of applications:

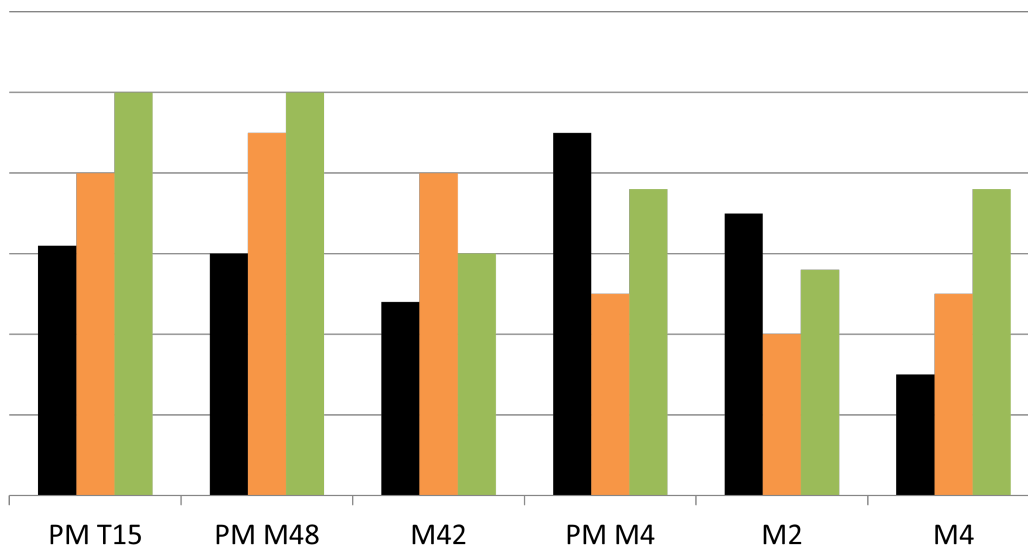
Broaches, end mills, form tools, gear hobs, milling cutters, spade drills, shaper cutters, taps.

### Chemical Composition

Carbon	Manganese	Silicon	Chromium	Vanadium	Tungsten	Molybdenum	Cobalt
1.50-1.60%	0.15-0.40%	0.15-0.40%	3.75-5.00%	4.50-5.25%	11.75-13.00%	0.00-1.00%	4.75-5.25%

### Comparison Chart

■ Toughness    ■ Red Hardness    ■ Wear Resistance



### Typical Heat Treat Response

Tempering Temp °F	Hardening Temp °F / HRC					
	2125	2150	2175	2200	2225	2250
As quenched	67	66.5	66	65.5	64.5	64
1000	65	65.5	66	66.5	67	67.5
1025	64.5	65	65.5	66	65	67
1050	64	64.5	65	65.5	66	66.5
1100	62	62.5	63	63.5	64	64.5
1150	57	58.5	59.5	60.5	61	61.5
1200	54	55	56	57	57.5	58
Minimum minutes at austenitizing temp.	10	10	10	5	5	5

### Size Changes During Hardening

Hardening Temp °F	Tempering Temp	HRC	Longitudinal Size Change %
2200	1025	66	+0.20%

### Surface Treatment

PM T15 can be nitrided or titanium-nitride coated if desired. If the CVD-TiN treatment is used, care is required in vacuum hardening.



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#### Forging

2000-2100 °F. Do not forge below 1700 °F. Slow cool after forging.

#### Annealing

1600 °F, hold 2 hours, slow cool (30 °F/hour maximum) to 1000 °F, then air or furnace cool.  
Annealed Hardness is 245-275 BHN.

#### Stress Relieving

(After machining) 1100-1300 °F, hold 2 hours and air or furnace cool.  
(Hardened parts) Temper 30 °F below original tempering temperature or 1000 °F minimum.

#### Hardening

Preheat to 1500-1550 °F, equalize.  
A second preheat at 1800-1900 °F is suggested for vacuum hardening.

#### High Heat (Austenitizing)

2125-2250 °F. Standard recommendation to achieve Rc 66-68 is to use 2225-2250 °F.

#### Quench

Vacuum or atmosphere quench to 1000-1100 °F, equalize, then air cool to room temperature.  
The vacuum or atmosphere quench rate through 1850-1300 °F range is critical to achieve optimum heat treat response.

#### Tempering

1000 °F minimum recommended. Triple tempering recommended.

### Physical Properties

Modulus of Elasticity	31 x 10 <sup>6</sup> psi (214 GPa)	Density	0.296 lb/in <sup>3</sup>
Annealed Hardness	245-275 BHN	Machinability	30% of O1