



# SB Specialty Metals LLC

Your **First Choice** for Specialty Metals

## PSB22 ESR – Technical Data

### General Descriptions:

PSB 22 ESR is a cold work tool steel produced by the ESR melting practice. This grade is characterized by an excellent balance of high wear resistance, and high chipping resistance.

Its high tempering temperatures make it a good substrate for most coatings.

### Example of applications:

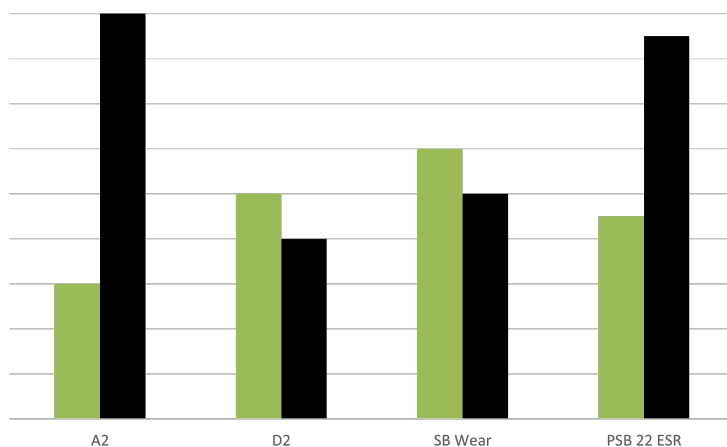
Shear blades, shredder knives, punches and dies, draw and form dies, cold heading dies, thread and form rolls and slitter knives.

### Chemical Composition

Carbon	Manganese	Molybdenum	Vanadium	Chromium	Silicon
0.90-1.05%	0.35-0.45%	1.95-2.15%	0.25-0.35%	7.90-8.10%	0.90-1.10%

### Comparison Chart

■ Wear Resistance ■ Toughness



### Typical Heat Treat Response

Tempering Temp °F	Hardness HRC		Toughness Charpy C-Notch Ft.-lbs
	1875 °F	1900 °F	
As Quenched	62-63	63-64	
400	61	61	31
500	60	60	41
600	59	59	37
700	60	60	33
800	61	61	31
950	62	63	30
1000	60	62	40
1025	58	60	---

### Size Changes During Hardening

Hardening Temp (F)	Tempering Temp	HRC	Longitudinal Size Change %
1875	1000	61	+0.08%

### Surface Treatment

PSB 22 is a very good substrate for PVD surface treatments.  
PSB 22 can be nitrided or titanium nitride coated.



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### Heat Treatment

#### Forging

PSB 22 can be forged between 1650-2010 °F.  
Annealing after forging is highly recommended.

#### Annealing

Heat to 1550 °F, hold for two hours, slow cool 50 °F/hour to 900 °F, then air cool to room temperature.

#### Stress Relieving

Performed after rough machining to minimize distortion in heat treating.  
1100-1200 °F, hold for two hours, then air cool to room temperature.

#### Hardening

Protective atmosphere or vacuum furnace equipment preferred.

#### High Heat (Austenitizing)

1875-1900 °F for 30 minutes at austenitizing temperature.

#### Quench

Quench rate of a minimum of 50 °F per minute down to 900 °F is critical to achieve best heat treat response.  
Temper immediately following quench when material reaches 150 °F or below.

#### Tempering

Minimum 400-1000 °F tempering temperature required.  
Double tempering is required, triple tempering recommended.  
Air cool to room temperature between tempers.

### Physical Properties

<b>Modulus of Elasticity</b>	30 psi x 10 <sup>6</sup> (207 GPa)	<b>Density</b>	0.281 lb/in <sup>3</sup>
<b>Annealed Hardness</b>	210/240 BHN	<b>Machinability</b>	80% of O1