



# SB Specialty Metals LLC

Your **First Choice** for Specialty Metals

## PSB27 - Technical Data

### General Description:

PSB27 is a premium spray formed D2 tool steel. It is ideal for many cold work applications requiring higher toughness and higher wear resistance than conventional D2. The spray forming process results in improved toughness and chip resistance compared to conventionally produced tool steels. PSB27 has 3 X the wear resistance of conventional D2.

### Example of applications:

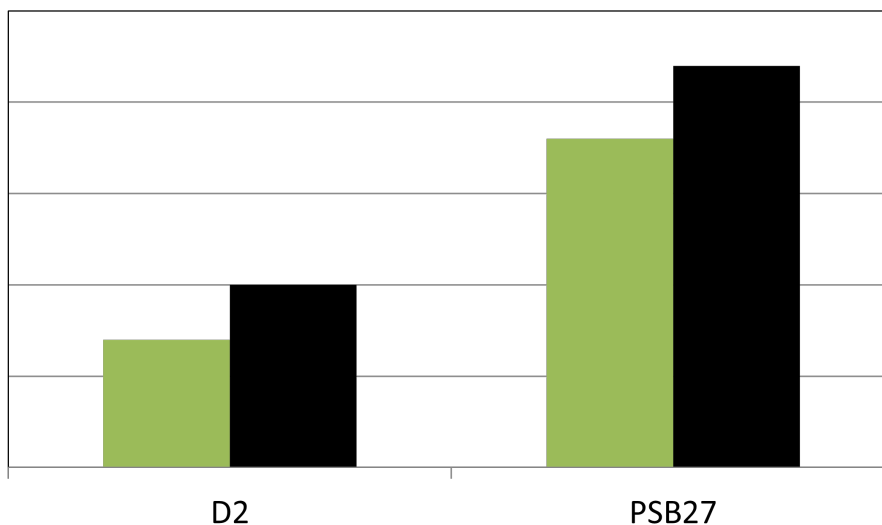
Rotational Cutting Dies, forming rolls and dies, thread roll dies, blanking dies and punches, injection screw components, industrial knives and cutlery knives.

### Chemical Composition

| Carbon       | Molybdenum   | Vanadium     | Chromium       | Silicon      | Manganese    |
|--------------|--------------|--------------|----------------|--------------|--------------|
| 1.50 - 1.60% | 0.65 - 0.80% | 0.75 - 0.90% | 11.00 - 12.50% | 0.40 - 0.50% | 0.30 - 0.45% |

### Comparison Chart

■ Wear Resistance ■ Toughness



### Typical Heat Treat Response

| Hardening Temp °F | Tempering Temp °F | Hardness HRC | Charpy C-Notch Ft.-lbs |
|-------------------|-------------------|--------------|------------------------|
| 1900              | 400               | 61           | 24                     |
|                   | 500               | 60           | 26                     |
|                   | 650               | 59           | 25                     |
|                   | 800               | 58           | 24                     |
|                   | 950               | 61           | 23                     |

### Size Changes During Hardening

| Hardening Temp °F | Tempering Temp °F | HRC  | Longitudinal Size Change % |
|-------------------|-------------------|------|----------------------------|
| 1900              | 500               | 60.5 | +0.03%                     |
| 1900              | 950               | 61   | +0.04%                     |

### Surface Treatment

Standard surface treatments such as nitriding, titanium-nitride coating, or hard chrome plating can be used. Prior to nitriding or PVD treatment, must double temper at or above process temperature.



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### Heat Treatment

#### Annealing

Heat to 1600°F, hold for two hours.  
Slow cool 25°F/hour to 1000°F.  
Then air or furnace cool to room temperature.

#### Stress Relieving

Normally performed 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)

Preheat to 1350-1400°F - let part equalize. Then austenitize at 1870/1900°F for a minimum of 30 minutes at austenitizing temperature.

#### Quench

Salt bath quench to 1000-1100°F, equalize, then air cool to 150°F.  
Vacuum or atmosphere quench rate of a minimum 50 °F per minute down to 1200 °F is critical to achieve best heat treat response.  
Temper immediately following quench.

#### Tempering

Minimum 400°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> .....(207GPa) | <b>Density</b>       | 0.283 lb/In <sup>3</sup> |
| <b>Annealed Hardness</b>     | 215-255 Brinell Hardness (BHN)         | <b>Machinability</b> | 90% of D2                |