



SB Specialty Metals LLC

Your **First Choice** for Specialty Metals

PM32CO – Technical Data

General Descriptions:

PM32CO is made by the Particle Metallurgy (PM) steel making process. It is an 8% cobalt super high speed steel which has excellent hot hardness along with good wear resistance and toughness. This grade has good machinability and grindability characteristics.

Examples of applications:

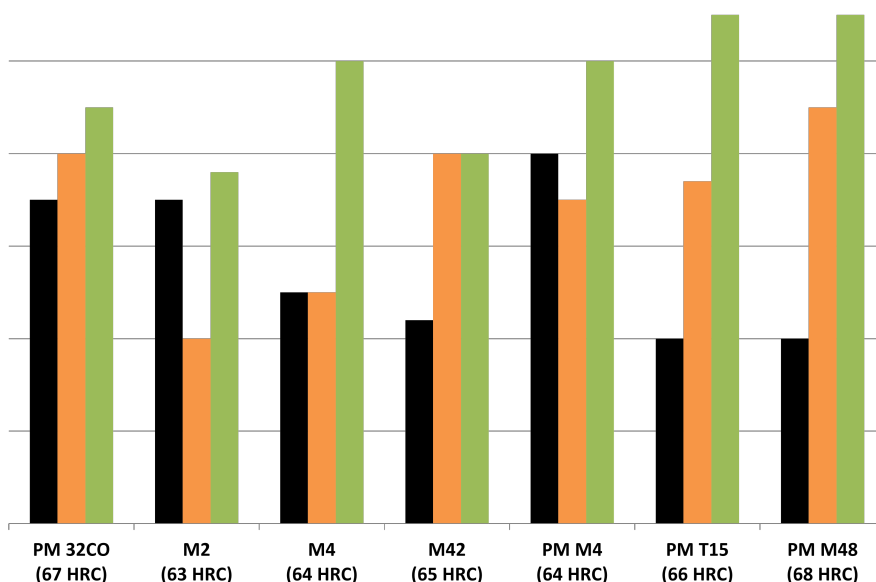
Broaches, end mills, form tools, gear hobs, milling cutters, extrusion punches, shaper cutters, taps.

Chemical Composition

| Carbon | Manganese | Phosphorous | Sulphur | Silicon | Molybdenum | Chromium | Vanadium | Tungsten | Cobalt |
|------------|------------|-------------|-----------|------------|------------|------------|------------|------------|------------|
| 1.25-1.35% | 0.20-0.75% | 0.30% Max | 0.25% Max | 0.45-0.70% | 4.80-5.10% | 3.75-4.25% | 2.75-3.25% | 5.75-6.50% | 7.75-8.25% |

Comparison Chart

■ Toughness ■ Red Hardness ■ Wear Resistance



Typical Heat Treat Response

| Tempering Temp °F | Hardening Temp °F / HRC | | | | |
|-------------------|-------------------------|------|------|------|------|
| | 2100 | 2125 | 2150 | 2175 | 2190 |
| As Quenched | 66 | 67 | 67 | 66 | 65.5 |
| 1000 | 65 | 66 | 67 | 67.5 | 68 |
| 1025 | 64.5 | 65.5 | 66.5 | 67 | 68 |
| 1050 | 63.5 | 64.5 | 65.5 | 66.5 | 67 |
| 1100 | 61 | 62 | 63.5 | 65 | 66 |
| 1150 | 57 | 59 | 61 | 63 | 64 |
| 1200 | 52 | 54 | 56 | 58 | 60 |

Size Changes During Hardening

| Hardening Temp °F | Tempering Temp °F | HRC | Longitudinal Size Change % |
|-------------------|-------------------|-----|----------------------------|
| 2175 | 1025 | 67 | +0.20% |

Surface Treatment

PM32CO can be nitrided or titanium-nitride coated. If the CVD TiN treatment is use, care is required in vacuum hardening.



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Heat Treatment

Annealing

1600 °F, hold 2 hours, slow cool (30°F/hour max) to 1000 °F, then air or furnace cool.
Hardness BHN 255/285.

Stress Relieving

After machining: 1100-1300 °F, hold 2 hour and air or furnace cool.

Hardening

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

High Heat (Austenitizing)

2100-2190 °F. Standard recommendation to achieve HRc 66-68 is to use 2175 °F.

Quench

Oil or atmosphere quench to 1000-1100 °F, equalize, then air cool to below 125 °F. Vacuum or atmosphere quench rate through 1850-1300 °F range critical to acheive optimum heat treat response.

Tempering

1000 °F minimum recommended. Triple tempering is required.

Physical Properties

| | | | |
|-----------------------|------------------------------------|---------------|--------------------------|
| Modulus of Elasticity | 31 x 10 ⁶ psi (214 GPa) | Density | 0.291 lb.in ³ |
| Annealed Hardness | 255 - 285 BHN | Machinability | 30% of O1 |