

M-50 steel is a premium-melted alloy refined using vacuum-induction melting (VIM) and vacuum-arc remelting (VAR) exhibiting excellent resistance to multi-axial stresses and softening at high service temperatures, as well as good resistance to oxidation.

STANDARDS •

- » USA: AISI M50
- » Europe: HS 0-4-1
- » UK: BM50
- » France: AFNORY80DCV.42.16
- » Germany: 1.3325

CHEMICAL COMPOSITION •

	C	Cr	Si	Mn	Mo	V	P	S
Min	0.78	3.75	0.20	0.15	3.90	0.80	--	--
Typical	0.83	4.10	0.40	0.30	4.30	1.00		
Max	0.88	4.50	0.60	0.45	4.75	1.25	0.035	0.035

APPLICATIONS •

- » Aircraft Engine bearings
- » Gas Turbines
- » Helicopter rotor bearings

FORM SUPPLIED •

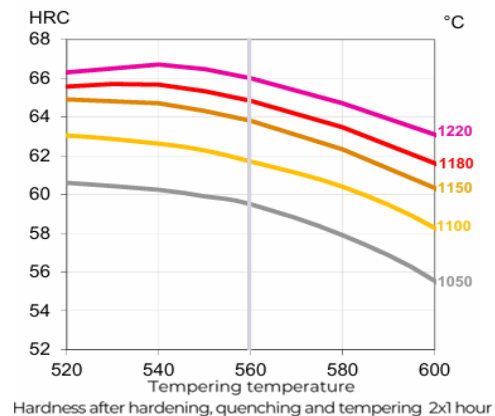
- » Billet
- » Round Bar
- » Flat Bar
- » Forging
- » Ring
- » Tubing

Available surface conditions : drawn, ground, hot rolled, cold rolled, peeled, turned.

HEAT TREATMENT •

- **Annealing:** Annealing is carried out at 1600° F (870° C), followed by cooling slowly to room temperature. Please note that Steel M-50 is susceptible to decarburization, which is not a wanted property given its use in tools and bearings. To mitigate decarburization, use inert or reduced-pressure atmosphere during the annealing process.
- **Hardening:** Hardening should be carried out after annealing. To properly harden Steel M-50, preheat the part to 1500° F(815° C) until the whole component is heated correctly. After preheating, increase the temperature to 2000° F(1090° C) for superheating. As with the preheating step, ensure that the whole part is heated equally before proceeding to immediate quenching in salt bath furnace or controlled atmosphere furnace. After the part was cooled using the quenching method, cool the piece to -100° F (-73° C) for 1 hour.
- **Tempering:** should be done immediately after quenching, with double tempering at 1025° F (550° C) recommended for achieving the best properties.

GUIDELINES FOR HARDENING •



Tool	Hardening	Tempering
multi edge cutting tools	1100-1120 °C	550-570 °C
cold work tools	1080-1120 °C	550-570 °C

DELIVERY HARDNESS . _____

- » Typical soft annealed hardness is 225 HB
- » Cold drawn and cold rolled material is typically 10-40 HB harder

PROCESSING . _____

M50 can be worked as follows :

- » Machining(grinding,turning,milling)
- » Polishing
- » Hot forming
- » Electrical discharge machining
- » Welding(special procedure incl. pre-heating & filler materials of base material composition)

GRINDING . _____

During Grinding, local heating of the surface, which can alter the temper, must be avoided. Grinding wheel manufacturers can provide advise on the choice of grinding wheels.

SURFACE TREATMENT . _____

The Steel Grade is a perfect substrate material for PVD coating. If nitriding is requested, a small diffusion zone is recommended but avoid compound and oxidized layers.

SIZES AVAILABLE . _____



ROUND	Starting From	Upto
DIAMETER	8 mm	500 mm
LENGTH	2000 mm	6000 mm

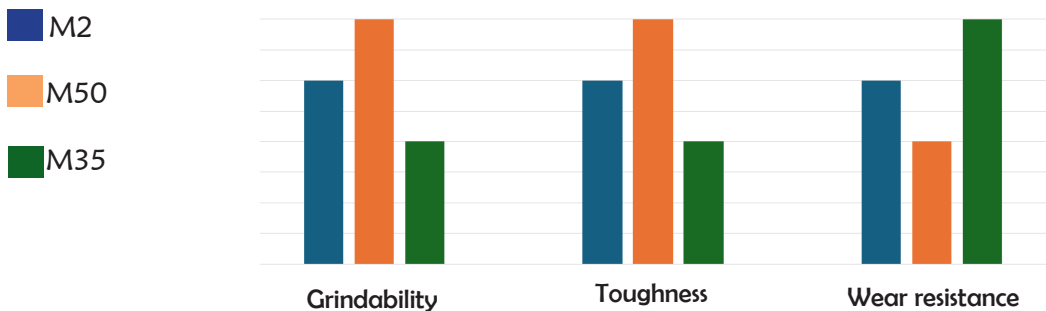


SQUARE BAR	Starting From	Upto
SIZE	8x8 mm	250x250 mm



FLAT	Starting From	Upto
THICKNESS	4 mm	205 mm
WIDTH	20 mm	400 mm

COMPARATIVE PROPERTIES . _____



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