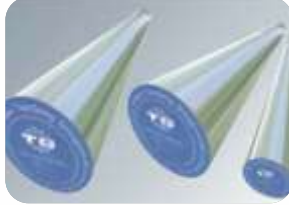


High Speed Steel

TG M-2 (DIN-1.3343)



Steel properties : For all metal-cutting tools for roughing or finishing, such as twist drills, all kinds of milling cutters, screw taps, screw dies, broaches, reamers, countersinks, thread chasers, segments for circular saws, shaping tools and woodworking tools. Also highly suitable for cold-forming tools, such as cold extrusion rams and dies, as well as cutting and precision cutting tools, plastic moulds with elevated wear resistance and screws.

Applications : Standard high-speed steel grade. High toughness and good cutting power owing to its well-balanced alloy composition; thus suitable for a wide variety to applications.

It is typical steel grade of W-Mo current hss, with high toughness, good thermal plasticity, high hardness, as well as red gardness and hot hardness.

TGM2 is suitable for produce in high quality cutting tools, such as hob, knife, and milling cutter. TGM2A is suitable for produce in common cutting tools with high toughness, also suitable for cold-forming tools. M2 is suitable for produce common tools.

Similar Steel Grade :

CHINA	BRAZIL	AUSTRIA	GERMANY	SLOVANIA	JAPAN			CHEZ. REP
TG	VILLARES	BOHLER	DEW	RAVNE	HITACHI	NIPPON	SANYO	POLDI
TGM2	VW/M2	S600	1.3343	BRM2	YXM1	H51	QH51	MAX SP. MO55

Chemical Composition: (%)

Indian IS	Chemical Analysis Typical Value % (Min - Max)											Delivery Condition	
	C	S	P	Si	Mn	Ni	Cr	Mo	V	W	other	Heat Treatment	Hardness
M2	0.86-0.94	<0.03	<0.03	0.20-0.45	0.20-0.40	***	3.80-4.50	4.70-5.20	1.70-2.10	5.90-6.70	***	Annealed	<255
M2A	0.83-0.85	Max 0.010	Max 0.030	0.30-0.40	0.20-0.40	0.10-0.12	3.90-4.20	4.80-4.85	1.80-1.90	6.00-6.20	***	Annealed	<255

Production process:

EAF→LF→VD→ESR→BLOOM IN FOLLOWING MACHINE :

QUICK FORGING (12.5MN), HAMMER, PRECISION FORGING

→ Precision Forging : ϕ 81 - 255mm
 Hot Rolled & Annealed Peeled (HRAP) : ϕ 14.5 - 80.0mm
 Cold Drawn / Sand Blasted (Coil) : ϕ 2.0 - 13.5mm
 Cold Drawn / Centreless Ground : ϕ 2.0 - 14.4mm

UNDER ANNEALED CONDITION :
Hardness : HB205-255

REDUCTION RATIO :
As 1:4 or 1:5

DELIVERY STATUS :

As Cold drawn / Hot rolled / forged, in annealed condition.

SIZE : Rounds

Cold Drawn/Centreless Ground Bar	Hot Rolled Bar	Forged bar	Coil
ϕ 2.0 - 14.4mm	ϕ 14.5 - 80.0mm	ϕ 81.0 - 255.0mm	ϕ 2.0 - 13.5mm

SIZE : Flats

Thickness	Width
5mm - 205mm	5mm - 810mm

SIZE : Squares

4mm to 100mm

SIZE : Sheets

Thickness	Width	Length
0.5mm to 12mm	810mm	2500mm

HEAT TREATMENT :

Annealing:

Annealing temperature : 860-880°C, keep this temperature by 2-4 hours, then cooling to 600°C in the speed of less than 30°C/h

If after cold drawn process, suggest add stress relieving annealing process Under the temperature of 600-700°C, keep this temperature by 2 hours.

Quenching & Tempering (salt bath)

Quenching :

Pre-heating in two steps :

Heating temperature under : 400-500°C and 850-900°C

Austenitizing temperature : 1185-1225°C

Heating coefficient 10-15 sec/mm, quenching under 580-620°C, then cooling to room temperature.

Tempering:

Tempering temperature under : 540-560°C, tempering 3 times, each time 1 hour, then cooling to room temperature.