

Steel grade

Material No. / Werkstoff-Nr.	PREMIUM HSS PM 4
Description	PMHS6-5-4
AISI/SAE	M4
Search for alternatives in the ABRAMS STEEL GUIDE®	www.steel-guide.eu/alternatives/M4

Specifications



€co-Präz* [€co]
L: 300 mm

Chemical composition AISI/SAE M4 (reference value %)

C	Si	Mn	P	S	Cr	Mo	V	W
1,25 - 1,4	0 - 0,45	0 - 0,4	0 - 0,03	0 - 0,03	3,8 - 4,5	4,2 - 5,0	3,7 - 4,2	5,2 - 6,0

Physical properties

Hardness (delivery condition)	max. 270 HB, annealed			
Tensile strength R_m (as received condition)	approx. 920 N/mm ²			
Working hardness	max. 65 HRC			
Thermal expansion coefficient $10^{-6}m/(m \cdot K)$	20 - 100°C	20 - 200°C	20 - 300°C	20 - 400°C
	10,6	11,7	11,9	12,4
Thermal conductivity $W/(m \cdot K)$	20°C	350°C	700°C	
	23,5	26,8	26,2	

Technical properties

High speed steel based on powder metallurgy with better wear and pressure resistance than AISI/SAE M3 and AISI/SAE M2, due to a very clean and homogeneous microstructure with evenly spread carbides optimising wear resistance.

Applications

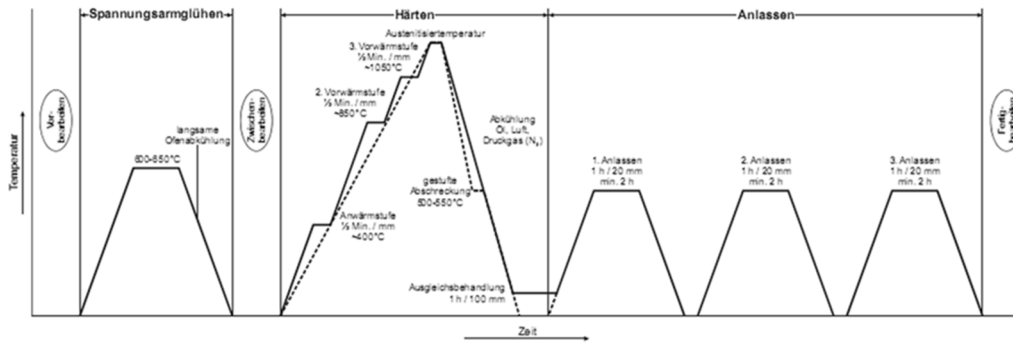
Stamping tools, precision cutting tools, machining tools, broaching tools, rotary knives, woodworking tools, gear shaper cutters, circular saw segments, metal saws, screw dies, countersinks, chasers, cold extrusion punches, deep drawing dies, plastic moulds with high wear resistance.

Heat treatment

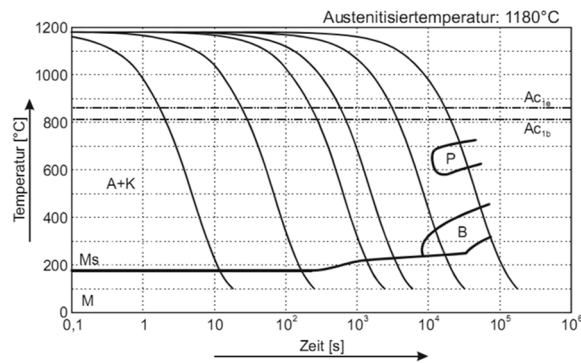
	Temperature	Cooling	Hardness
Soft annealing	870 - 900°C	Furnace	max. 270 HB
Stress relief annealing	Temperature	Cooling	
	600 - 650°C	Furnace	
Hardening	Temperature	Quenching in	
	1050 - 1230°C	Air, oil, compressed gas (N ₂), hot basin (500 - 550°C)	



Heat treatment scheme



Continuous ZTU-diagram



Tempering / Austenitizing Temperature

Anlasstemperatur	Austenitisierstemperatur		
	1120°C	1160°C	1200°C
Ansprunghärte	65,0 HRc	65,0 HRc	65,0 HRc
540°C	64,0 HRc	64,5 HRc	65,0 HRc
550°C	63,0 HRc	64,0 HRc	65,0 HRc
560°C	62,0 HRc	63,5 HRc	64,5 HRc
580°C	61,0 HRc	62,0 HRc	63,0 HRc
590°C	59,0 HRc	60,0 HRc	62,0 HRc

