

DE - Brand:

Special Steel

PMD53

Chemical composition:
(Typical analysis in %)

C	Cr	W	Mo	V			
2,48	4,20	4,20	3,10	8,00			

Steel properties:

Powder-metallurgical high-speed steel, fine distributed carbide structure, homogenous microstructure within whole cross-section, high bending and compressive strength, very good wear resistance.

Applications:

Cold work tools for forming, fineblanking, cutting and stamping. Roller shear knives and industrial knives for wood, paper and pulp. Cutting rollers for hygiene articles. Profile and shaping rollers.

Condition of delivery:

Soft annealed to max. 300 HB

Physical properties:

Thermal expansion coefficient	$\left[\frac{10^{-6} \cdot \text{m}}{\text{m} \cdot \text{K}} \right]$	20-100°C	20-200°C	20-400°C	20-600°C
		10,5	11,0	11,2	11,7
Thermal conductivity	$\left[\frac{\text{W}}{\text{m} \cdot \text{K}} \right]$	20°C	400°C	600°C	
		24,1	28,0	26,9	

Heat treatment:

Soft annealing
Annealing only in neutral atmosphere

Temperature	Cooling	Hardness
850 - 900°C	furnace	max. 300 HB

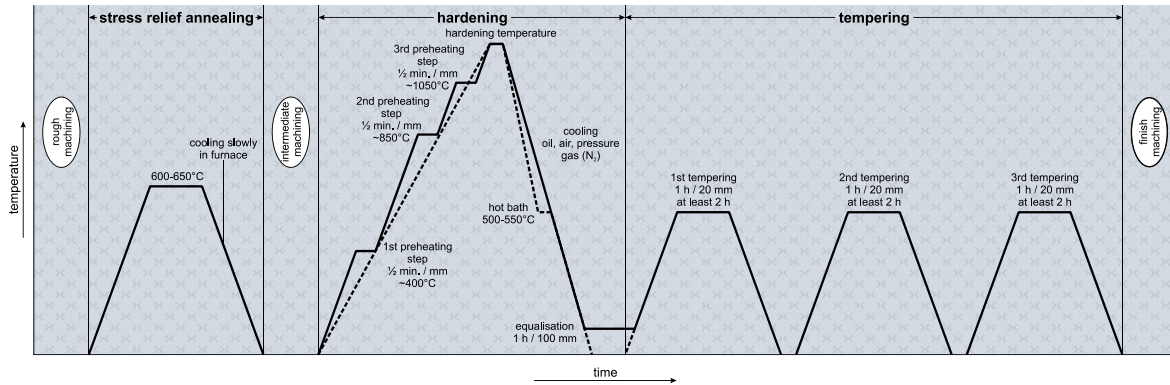
Stress relief annealing

Temperature	Cooling	
600 - 650°C	furnace	

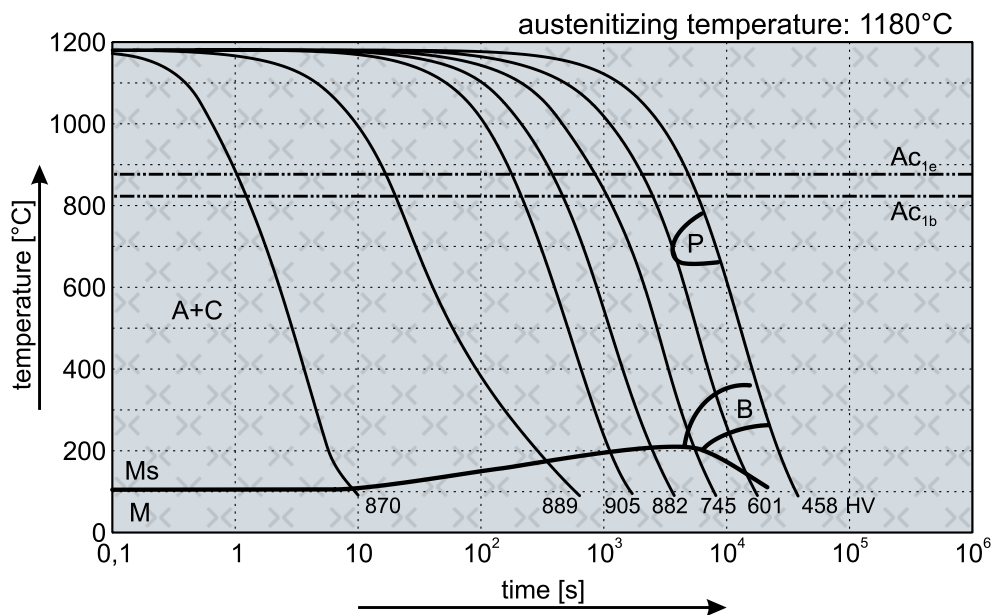
Hardening

Temperature	Cooling	Tempering
1000 - 1180°C	oil, pressure gas (N ₂), air or hot bath 500 - 550°C	see tempering table

(PMD53) Thermal Cycle Diagram



Continuous Cooling Transformation Diagram (CCT)



DE-Brand PMD53 has to be tempered minimum three times with 540-560°C in any case.

Reference values for hardness after tempering three times, according to the austenitizing temperature (all datas ±1 HRC).

Tempering temperature	Austenitizing temperature			
	1000°C	1050°C	1100°C	1180°C
520°C	61,5 HRC	63,0 HRC	64,0 HRC	66,0 HRC
540°C	60,5 HRC	62,0 HRC	63,5 HRC	66,0 HRC
560°C	59,0 HRC	60,5 HRC	62,0 HRC	65,0 HRC
580°C	56,5 HRC	58,0 HRC	60,0 HRC	63,0 HRC
600°C	53,5 HRC	55,5 HRC	57,5 HRC	60,5 HRC