

Special Steel

DE - Brand:

PMD52**Chemical composition:**
(Typical analysis in %)

C	Cr	W	Mo	V	Co		
1,60	4,80	10,00	2,30	5,10	7,90		

Steel properties:

Powder-metallurgical high-speed steel with high W- and Co-content, very fine carbide distribution, high hardness and wear resistance at elevated temperatures (increased compared to PMD30), homogenous microstructure within whole cross-section, very good grindability.

Applications:

Machining tools, milling cutters, thread cutting tools for tough machinable materials (high-strength steel or non-metallic material), precision blanking tools, stamping or deep-drawing dies.

Condition of delivery:

Soft annealed to max. 300 HB

Physical properties:

Thermal expansion coefficient	$\left[\frac{10^{-6} \cdot \text{m}}{\text{m} \cdot \text{K}} \right]$	$\frac{20-100^{\circ}\text{C}}{10,0}$	$\frac{20-250^{\circ}\text{C}}{10,8}$	$\frac{20-500^{\circ}\text{C}}{11,3}$	$\frac{20-700^{\circ}\text{C}}{11,6}$
Thermal conductivity	$\left[\frac{\text{W}}{\text{m} \cdot \text{K}} \right]$	$\frac{20^{\circ}\text{C}}{24,0}$			

Heat treatment:

Soft annealing
Annealing only in neutral atmosphere

Temperature	Cooling	Hardness
800 - 840°C	furnace	max. 300 HB

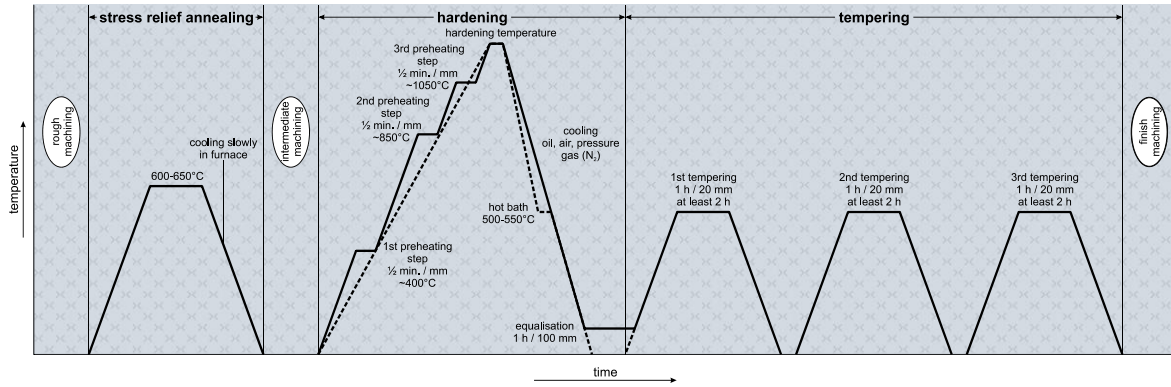
Stress relief annealing

Temperature	Cooling	
600 - 650°C	furnace	

Hardening

Temperature	Cooling	Tempering
1100 - 1240°C	oil, pressure gas (N ₂), air or hot bath 500 - 550°C	see tempering table

(PMD52) Thermal Cycle Diagram



DE-Brand PMD52 has to be tempered minimum three times in any case.

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

Tempering temperature	Austenitizing temperature			
	1100°C	1150°C	1200°C	1240°C
540°C	63,0 HRC	66,0 HRC	67,0 HRC	68,0 HRC
560°C	62,0 HRC	65,0 HRC	66,0 HRC	67,0 HRC
580°C	61,0 HRC	63,0 HRC	65,0 HRC	66,0 HRC
600°C	60,0 HRC	61,0 HRC	63,0 HRC	65,0 HRC