

DE - Brand:

# Special Steel

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

## Heat treatment:

Soft annealing  
Annealing only in neutral atmosphere

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

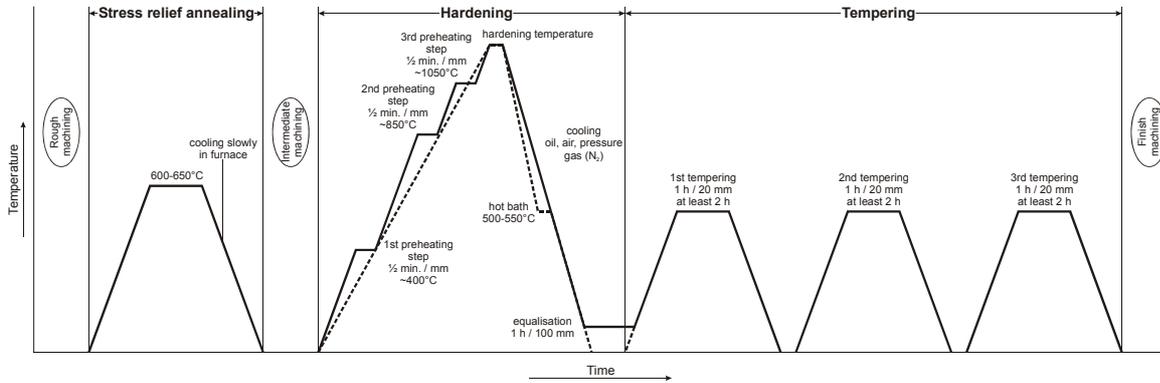
Stress relief annealing

Temperature	Cooling	
600 - 650°C	furnace	

Hardening

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

## (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