

# Special Steel

DE - Brand:

## PMD V10

### Chemical composition: (Typical analysis in %)

C	Cr	Mo	V				
2,90	8,00	1,40	9,80				

### Steel properties:

Powder-metallurgical cold work tool steel with high V-content, very fine carbide distribution, homogenous microstructure within whole cross-section, increased wear resistance compared to PMD10.

### Applications:

Stamping, cutting and deep drawing tools, screws and screw parts, cold extrusion tools.

### Condition of delivery:

Soft annealed to max. 280 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	20-300°C	20-400°C
		10,8	11,0	11,2	11,4
Thermal conductivity	$\left[ \frac{\text{W}}{\text{m} \cdot \text{K}} \right]$				

### Heat treatment:

Soft annealing  
Annealing only in neutral atmosphere

Temperature	Cooling	Hardness
880 - 910°C	furnace	max. 280 HB

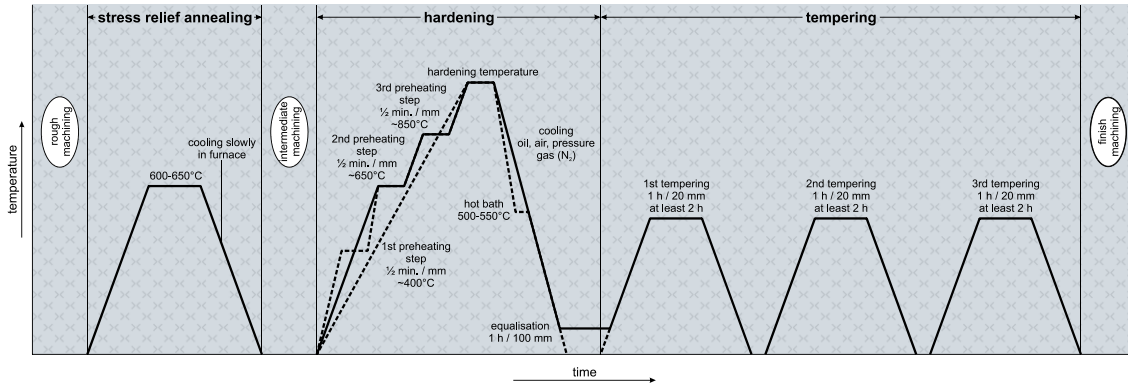
Stress relief annealing

Temperature	Cooling	
600 - 650°C	furnace	

Hardening

Temperature	Cooling	Tempering
1020 - 1120°C	oil, pressure gas (N <sub>2</sub> ), air or hot bath 500 - 550°C	see tempering table

## (PMD V10) Thermal Cycle Diagram



**DE-Brand PMD V10 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		
	1020°C	1060°C	1100°C
450°C	62,0 HRC	64,0 HRC	64,5 HRC
480°C	63,0 HRC	65,0 HRC	66,0 HRC
500°C	62,0 HRC	64,0 HRC	65,5 HRC
530°C	61,0 HRC	62,0 HRC	63,5 HRC

Remarks: All technical information is for reference only.