

DE - Brand:

Special Steel

PMD10

Chemical composition:

(Typical analysis in %)

| | | | | | | | |
|------|------|------|------|--|--|--|--|
| C | Cr | Mo | V | | | | |
| 2,45 | 5,25 | 1,20 | 9,75 | | | | |

Steel properties:

Powder-metallurgical cold work tool steel with high V-content, very fine carbide distribution, segregation free, increased wear resistance compared to PMD9.

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 |
| | | 11,0 | 11,1 | 11,3 | 11,5 |
| Thermal conductivity | $\left[\frac{\text{W}}{\text{m} \cdot \text{K}} \right]$ | | | | |

Heat treatment:

Soft annealing
Annealing only in neutral atmosphere

| Temperature | Cooling | Hardness |
|-------------|---------|-------------|
| 870 - 900°C | furnace | max. 280 HB |

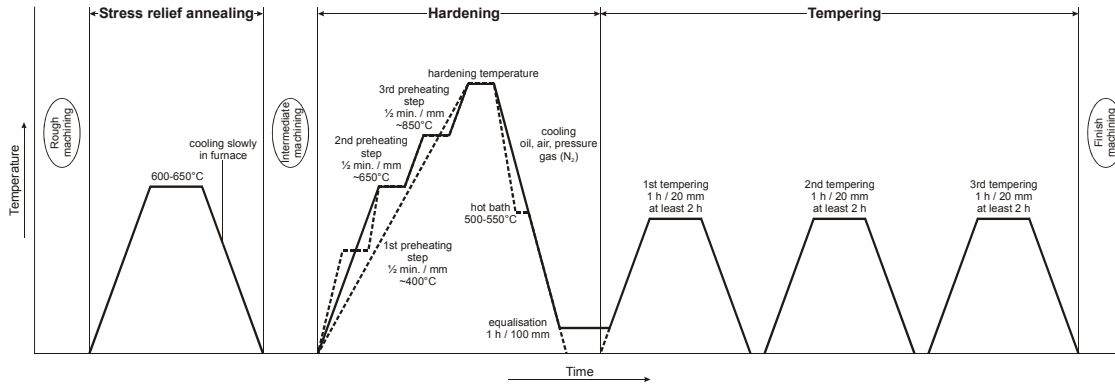
Stress relief annealing

| Temperature | Cooling | |
|-------------|---------|--|
| 600 - 650°C | furnace | |

Hardening

| Temperature | Cooling | Tempering |
|---------------|--|--------------------------|
| 1050 - 1170°C | oil, pressure gas (N ₂), air or hot bath 500 - 550°C | see tempering diagram |

(PMD10) Thermal Cycle Diagram



DE-Brand PMD10 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 | | | | |
|-----------------------|---------------------------|----------|----------|----------|----------|
| | 1050°C | 1080°C | 1110°C | 1140°C | 1170°C |
| 470°C | 59,5 HRc | 60,5 HRc | 61,5 HRc | 62,5 HRc | 63,5 HRc |
| 490°C | 61,5 HRc | 62,0 HRc | 63,0 HRc | 64,0 HRc | 65,0 HRc |
| 510°C | 62,0 HRc | 63,0 HRc | 63,5 HRc | 64,4 HRc | 65,0 HRc |
| 530°C | 60,0 HRc | 61,0 HRc | 62,0 HRc | 63,0 HRc | 64,0 HRc |
| 550°C | 56,0 HRc | 57,5 HRc | 59,0 HRc | 60,0 HRc | 61,0 HRc |
| 570°C | 50,5 HRc | 51,0 HRc | 55,0 HRc | 57,0 HRc | 57,5 HRc |

Remarks: All technical information is for reference only.