

<b>Quality</b>	<b>120WV4</b>	Supply conditions:
According to standards		Annealed
Number	<b>1.2516</b>	

## Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	W%	V%
1,15-1,25	0,15-0,30	0,20-0,35	0,035	0,035	0,15-0,25	0,90-1,10	0,07-0,12

## Temperature °C

Hot-forming	Stress-relieving	Pre-heating for <sup>1)</sup> and <sup>2)</sup>	Quenching <sup>1)</sup>	Quenching <sup>2)</sup>	Tempering for <sup>1)</sup> and <sup>2)</sup>	
1050-850	600-650 calm air	400-450 pause, then ▲ <sup>1)</sup> or <sup>2)</sup>	▲ 780-800 water	▲ 810-830 oil or polymer	180-250 calm air minimum 2 cycles	
Soft annealing	Tempering		Pre-heating welding	Stress-relieving after welding		
710-740 furnace cooling to 500, then air	see table		250-300	650 furnace cooling		
(HB max 230)			<b>Ac1</b>	<b>Ac3</b>	<b>Ms</b>	<b>Mf</b>
			730	755	190	-20 <sup>b)</sup>

<sup>b)</sup> subcooling

the symbol ▲ indicates the climb of the temperature until .....°C ▲

## Mechanical and physical properties

**Table of tempering** values at room temperature after quenching at 820 °C in oil

	50	100	150	200	250	300	350	400	450	500	550	600
<b>HB</b>	758	739	714	688	624	595	560	496	482	432	390	336
<b>HRC</b>	66	65	63.5	62	58.5	57	55	51	50	46	42	36
<b>N/mm<sup>2</sup></b>					2375	2240	2070	1820	1760	1520	1340	1110
Tempering at °C	<b>50</b>	<b>100</b>	<b>150</b>	<b>200</b>	<b>250</b>	<b>300</b>	<b>350</b>	<b>400</b>	<b>450</b>	<b>500</b>	<b>550</b>	<b>600</b>

**Modulus of elasticity** longitudinal GPa 215

**Modulus of elasticity** tangential GPa 82

**Thermal expansion** 10<sup>-6</sup> · K<sup>-1</sup> 10.5 11.0 11.5 12.2 13.0

**Thermal conductivity** W/(m·K) 31.5

**Specific heat capacity** J/(Kg·K) 460

**Specific electric resist.** Ohm·mm<sup>2</sup>/m 0.30

**Electrical conductivity** Siemens·m/mm<sup>2</sup> 3.33

**Density** Kg/dm<sup>3</sup> 7.85

Testing at °C 20 100 200 300 400 500

### Tool steel for cold-working

- steels containing tungsten with a considerable resistance to wear
- extremely suitable for heat treatment; it can also be quenched in water
- limited deformations during heat treatment
- easily machinable after annealing
- suitable for grinding
- applications: *screw taps, twist bits, centre bits, cutting tools, blades for metals, broaches, timber machining tools, lockpins, nose cone, wear proof parts, ejectors, reamers, countersinks, engraving tools*